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Wire Prices Adjusted

Otherwise Finished Products Are Unchanged

Quietness in All Markets—Advance for Puddlers and Other Iron Rolling Mill Workers

The announcement of the $1.70 basis for wire nails and $1.50 for plain wire in the past week does not represent a $3 per ton reduction, as has been stated in some quarters, but rather amounts to a formal notification that on the new basis buyers may safely contract for a time. Prices recently current have been in some cases within $1 a ton of the new figures.

Both as to prices and new demand iron and steel markets show no measurable change in the past week. The operation of the mills is generally close to the rate maintained in June. Expectations of a buying movement are now centering about late September. The policy of the railroads to buy on the most sparing scale is making more impression on the general situation as the summer advances. Yet it does not appear that the mills are making any aggressive campaign for new business. Enlargement of plant has been so general, that with a good many mills operating on a 75 per cent. basis no important producer has been found attempting to assert a special title to the full employment of all its capacity.

Structural work is one of the mainstays of the steel trade, and all the important fabricating plants have work that will carry them well into the fall. The Quebec bridge, calling for 60,000 to 70,000 tons, will come up formally September 1, and there are indications of sharp international competition involving at least German, British and American works. Tariff concessions have been asked on the material required.

Export business holds up well. A recent contract taken by the leading interest is 3000 tons of structural steel for a coal handling plant at Rio Janeiro.

Gas and oil pipe line inquiry continues heavy. Portland, Maine, is close to a decision on its large water pipe contract, which will mean either 20,000 tons of cast iron pipe or 10,000 tons of riveted steel pipe.

An agreement was reached this week between the Republic Iron & Steel Company and the Amalgamated Association on the wage scale for the coming year. Puddlers will receive $6.12½ on a 1.45c. card, which represents an advance of 50c. from the 1909 basis. On busheling the advances range from 7½c. to 37½c. a ton. To finishers the increases are from 3½ to 4.7 per cent.

Open hearth steel billets have shared in the decline in Bessemer steel, and are now on a $26, Pittsburgh, basis.

Pig iron buying shows some further shrinkage; the volume has been too small, indeed, to affect prices. Here and there foundries seek to contract for deliveries extending into 1911 at to-day's level, but producers hold back. In Virginia iron some business has been done at $13.50, and Alabama iron for prompt shipment has sold in a small way at $11.25 for No. 2; but consumers are not convinced that the decline has gone its full length.

On two lots of steel making iron bought in the Cincinnati district—5000 to 6000 tons of basic and 3000 to 4000 tons of Bessemer—new low prices are reported.

Coke is more active, and several long time contracts have been closed, the price on one large transaction in foundry coke being slightly below $2.25, at oven. Curtailment in coke output has gone far enough to make the market a trifle firmer.

Though 60 lake freighters have been out of commission since independent owners decided to tie up 20 per cent. of the tonnage for 30 days, there are still a good many more boats than cargoes. The effort of some blast furnacemen to have portions of their ore contracts carried over to 1911 have not been successful thus far.

In metals, pig tin has caused some commotion. Under remarkable buying, amounting to 700 tons in New York, the price has advanced in the week from 32.67½c. to 33.25c., and speculators for the rise are evidently aiming at higher prices, as no important arrivals are expected before August 1. Copper has declined to 12.25c. for electrolytic and a 12c. market is freely predicted.

The Decline in Iron and Steel Prices

The formal and general reduction in the price of wire products in the past week and the published comments upon it bring up the whole question of the readjustment in iron and steel prices that has been under way for some time. The impression conveyed by some of these comments is that what has happened in the finished steel market in the past few weeks represents abrupt and radical declines in price. This is not the case. It is true that the disparity between steel making capacity and the volume of new buying in finished products has become more marked in the past three months than in the first quarter of the year. The whole industry may be said to be working closer to-day, and has been so working, in fact, since it became well established early in the year that a stocking up process had been going on and that we had not come, so soon after the depression of 1907 and 1908, to a consumption of 31,500,000 tons of pig iron in a year. It is very clear now that in the buying movement of the fall of 1909 many consumers placed orders with the double purpose of making sure of material as needed and of protecting themselves against possible advances in prices. Time has been needed to digest the steel taken up in that broad movement and it is not to be expected that it will be repeated in kind or in degree this year. Meantime the contraction of demand will naturally be attended by some recession in prices.

It will be of interest to show the relation of prices now prevailing for pig iron, steel billets and representative forms of finished material with the high points of 1907, the low points of 1909 following the declaration of an open market on steel products in February of last year, and the high points of the early months of this year. The comparison is made in the following table:

Comparison of Prices of Iron and Steel Products in 1907, 1909, and 1910.

	High, 1907.	Low, 1909.	High, 1910.	July 20, 1910.
Bessemer pig iron, Valleys	$23.28	$14.58	$19.00	$15.50
Basic pig iron, Valleys	23.00	14.12	16.87	14.50
Southern No. 2 fdry iron, Cinti.	26.00	14.25	17.25	14.75
Bessemer billets, Pittsburgh	30.00	22.00	27.50	25.00
Plates, Pittsburgh	1.70c.	1.10c.	1.55c.	1.40c.
Structural shapes, Pittsburgh	1.70c.	1.10c.	1.55c.	1.40c.
Steel bars, Pittsburgh	1.60c.	1.05c.	1.50c.	1.45c.
Sheets, 28 gauge, Pittsburgh	2.55c.	2.10c.	2.40c.	2.30c.
Tin plates, Pittsburgh	$3.85	$3.45	$3.60	$3.60
Plain wire, Pittsburgh	1.90	1.40	1.65	1.50

The Bessemer and basic pig iron prices in the first three columns are monthly averages and represent the highest monthly average in 1907 and 1910 and the lowest monthly average in 1909. It should be noted also that the prices given in the third column as the highest for 1910 were also the highest for the movement of the second half of 1909, except in the cases of Southern iron and basic iron. The former reached $17.75 at Cincinnati for prompt delivery in December, 1909, and the latter reached $17.25 at valley furnace in the same month. With these exceptions all the products named entered 1910 at the high point of the buying movement that culminated in the latter part of last year.

In general it will be seen that present prices are between the low points of 1909 and the high points of late 1909 and early 1910. Pig iron has come much closer to the low points of last year than have finished materials. The latter have receded only moderately from the high level to which the heavy buying of 1909 carried them; though it is to be said in this connection that the bulk of the deliveries on finished materials in the eight months of 1909 following April were at prices averaging considerably less than those of to-day.

Raw material costs and labor costs to-day are higher than the average for 1909, so that with all the economies the various steel companies mastered last year, they could not stand any material reduction in the prices of their products without a noticeable shrinkage in earnings. What stands out prominently in the table we have given is that thus far the inroad upon prices indicates no serious struggle for tonnage. The record of the market in recent weeks has been to the same effect. The situation is quite different from that which brought out the low prices of 1909. And the chief significance of this difference is that to-day, with 12 months of unparalleled consumption behind them, steel manufacturers are not dealing with a market that waits for the stimulation of price reductions. Whatever differences of opinion there may still be as to the price policy of 1908 and 1909, it is plain that in the second half of 1910 iron and steel prices will be largely controlled by developments from without rather than from within the trade.

Safeguarding Shop Environments

An interesting object lesson in the necessity of making a very thorough investigation in the selection of a manufacturing location is afforded by the experience of an important enterprise which proposed to establish its plant near an Eastern city. The company purchased land in an industrial suburb, and prepared plans for a large factory, the initial unit of

which would employ 800 men, with expectations of an early increase. Some work had been done on the site before it was discovered that the atmosphere of the neighborhood was polluted by the operations of a rendering company. Desiring to proceed with its plans as prepared, the manufacturing company has appealed to the State Board of Health, asking for the abatement of the nuisance. The statement made to the board is an illuminating exposition of the danger of installing the most approved hygienic equipment where the environments are unwholesome, as shown by the following paragraphs taken from it:

> As we would like to have our employees working under the very best conditions, we have paid special attention to the ventilating system in laying out the plans for our factory, and these plans include the equipping of our new works with large ventilating towers in which the incoming air will be cooled down in summer by means of refrigerating plants, and the air in the entire works will be changed eight or ten times an hour during summer, and four or five times per hour during winter. Without going further into the matter, we think you will readily see that the odor at present pervading the atmosphere about our plant would fill our works with foul instead of fresh air, so that working conditions would be impossible.
>
> In view of the foregoing, our Board of Directors has decided to stop all work on the erection of our factory on this property and not to proceed with such work until we have a positive assurance from your board that the present conditions above complained of will be remedied—otherwise we will have to look around for a more suitable location for our works.

In all cities, but more particularly in their outlying districts, there are some processes conducted with accompaniments which approach the limits of the obnoxious. The modern industrial plant, with its splendid equipment designed to promote the health and increase the comfort of employees, should be hemmed in by no such nuisance. One of the first steps in the planning should certainly be a searching scrutiny of the surrounding territory.

Disreputable Ingenuity

It seems almost incredible that manufacturers of good standing will stoop to seriously fraudulent practices for the purpose of increasing their profits. Most flagrant instances of this character have recently been exposed by the Commissioner of Weights and Measures of New York City. For some time the city authorities have been unusually zealous in looking after the interests of consumers, especially the great body of people who are obliged to make their purchases in small quantities. It has been found necessary to adopt the most stringent regulations for the protection of retail buyers who have for a long time been imposed upon by the use of weights and measures which diminish the quantity presumed to be purchased. The commissioner has discovered that much ingenuity has been exercised in the manufacture of scales for the purpose of defrauding the consumer. Exceedingly clever arrangements have been devised by which the consumer has been cheated, the indicator in his view showing him to be getting full weight.

The worst feature about this matter is that the dealers who are using the fraudulent scales have not themselves originated nor suggested the methods by which the cheating has been perpetrated. It is alleged by them that certain manufacturers of scales have invented the peculiar constructions used for this purpose. The salesmen of such manufacturers have for years been canvassing the retail merchants and have induced them to adopt these methods of cheating. The object in doing this has been to secure greater profits in the sale of scales. A higher price has been realized for them by reason of the fact that such ingenious methods of deception have been incorporated in their construction. The merchants have paid well for the scales because the salesmen have shown how the profits realized on the shorter weights would quickly pay for the increased cost and be a steady source of remuneration thereafter.

The sale of these fraudulent weights and measures has undoubtedly been large in other parts of the country. The evil practice should receive such a thorough airing that honest manufacturers will be benefited. Many manufacturers of scales and other weighing and measuring devices are known to be thoroughly honorable and above resorting to such devious methods of increasing their profits.

The Sales Engineer and His Duties

The sales engineer is one of the latest institutions of the machine tool industry. His work is not new; it is to act with the selling force, notably with the dealers and their representatives in the field. The machinery manufacturer has always realized to a greater or less degree the necessity of active co-operation on the part of the practical engineering staff of his establishment with the sales end of the business. The sales engineer is the development of a better understanding of the advantages of a specialization in this department commensurate with the degree of specialization in the product of his house and in the methods of manufacturing of its customers.

The sales engineer holds himself in readiness for the call of the selling corps. He supplies the technical and practical knowledge which the customer may require in selecting equipment, especially where the expenditure of large sums of money is involved, and where the proposed venture goes beyond the machinery practice with which the user is familiar. The salesman often finds it difficult to prove to a buyer the economies of manufacture or the improvement in product which new equipment would effect, though the argument be based on facts and should be convincing. The technical engineer supplies the detailed information which may be the deciding factor of the negotiations. If a machine is purchased or is installed on trial, his expert knowledge is brought into play in the training of the men who are to operate it and who are to supervise its use. He stands to prevent the bad results which may follow the placing of a good tool in the hands of unskillful or prejudiced hands. Not only is his function one of high importance in selling machinery, but he also does much to reduce that not insignificant item of costs, the investigation of complaints and the correction of troubles. These often breed the indirect losses which come from unfavorable criticism founded upon the avoidable failure of an individual installation.

One Effect of Padded Inventories

Professional accountants observe a growing tendency on the part of manufacturing firms or close corporations, as distinguished from the larger stock companies, to eliminate the padding of inventories with old buildings and machinery of little actual worth, thus

enabling them to determine more accurately the true condition of their properties. The effect on the machinery market of this adherence to a better standard of factory accounting than in former years—a tendency which also manifests itself in other directions—cannot fail in the long run to be beneficial. Instances are known in which plants have suffered considerably from the lack of badly needed equipment because the inventories showed an apparent abundance of tools and the directors, located away from the works, could not see the necessity for buying more of the same kind. The padding of inventories has done much harm in many ways, but this is one result that has gone beyond the walls of the establishment to be felt by the general trade.

The Iron Age Index

The index to Volume 85 of *The Iron Age*, January 1 to June 30, 1910, has been compiled and printed and will be mailed to subscribers applying for it. A list of those who have received the index heretofore is kept in this office, and to all such the latest one will be mailed without notice from them. Additional names will be put upon this list on request.

Correspondence

Blast Furnace Results with Nature's Dry Air

To the Editor: In the June number of *Metallurgical and Chemical Engineering* appeared a letter by R. H. Sweetser giving some of the results of the work of the east furnace of the Columbus Iron & Steel Company, Columbus, Ohio, for the six months ending March 31, 1910. Mr. Sweetser's contention is that none of the dry blast furnaces have done any better, as far as known to him, than this furnace, and the general implication is that the dry blast is not necessary in such work.

This implication is essentially unfair. Mr. Sweetser has chosen the six months which covered what old residents of Ohio admit to be the longest, steadiest and most severe winter within the recollection of any one now living, the result being that he had the benefit of dry blast produced by nature without cost to him. And it is an interesting fact that in spite of his disbelief in the dry blast, Mr. Sweetser has a most excellent set of air inlet pipes to his blowing engines, which extend out of doors and turn down with a huge inverted funnel on the bottom, giving him outside air and effectually preventing the entrance of any suspended moisture. Therefore the natural outside air which nature supplied to all during the last winter was received by Mr. Sweetser's engines in its natural condition, not polluted with any moisture from the engine room as is so often the case.

In order to confirm the statement made above as to the natural dryness of the air during the six months in question. the records of the Columbus Weather Bureau were obtained, and the humidity for the six months ending with March as thus shown is given here in pounds of moisture per 1000 cu. ft.:

October	0.378	January	0.195
November	0.407	February	0.163
December	0.168	March	0.33

Average for the six months, 0.273.

The average for the six months is 1.9 grains per cubic foot in the more ordinary unit, and is as low as operators of dry blast plants aim to carry their humidity. In December, when Mr. Sweetser did his best month's work, the humidity was, in grains per cubic foot, 1.2, corresponding to an average dew point of about 22 degrees F. lower than it is commercially practicable to carry the blast with dry blast plants ordinarily.

Under the circumstances there does not seem to be any reason why Mr. Sweetser should not have obtained about the same results that the dry blast furnaces do, and this is apparently about what he has done, as the furnaces on dry blast at South Chicago, right on the lake shore, were running on about 1950 lb. of coke in the middle of last summer.

Mr. Sweetser is evidently proud of the tonnage produced by his furnace, which went to 9000 tons during one of the months in question, on a 55 per cent. ore mixture, but this tonnage will not seem remarkable to those who are familiar with the recent work of the No. 2 furnace of the Republic Iron & Steel Company at Thomas, which made 8992 tons of foundry (not basic) iron in May, with a 39 per cent. yield of ore, making 3100 lb. of slag per ton of iron. This furnace is 18 ft. in the bosh and 12 ft. in the hearth, the same as Mr. Sweetser's, the hight being 90 ft. This, if it is an advantage at all, does not more than offset the much greater hardness and irreducibility of the red ore, which constituted three-fourths of its burden, as against the softness and greater reducibility of the Mesaba ore, which constitutes 70 per cent. of Mr. Sweetser's burden. The coke consumption was naturally much higher than Mr. Sweetser's, on account of the irreducibility of the ore and the great slag volume, and particularly on account of the humidity, which averaged about 0.9 for the month. In December, when the humidity was about 0.35, the coke consumption was several hundred pounds lower, and if the same rate of driving had been attained during that month as was attained in May, the tonnage would have been far larger.

If this coming autumn Mr. Sweetser will report the records of the six months ending September 30, it will be very easy to determine whether his excellent work was caused by the dry blast provided by nature or whether he has some secret of producing such results without the aid of the dry blast.

The critical temperature and available heat charts published by Johnson several years ago indicate that for the current six months Mr. Sweetser's coke consumption, other things being equal, will be about 300 lb. per ton of iron higher. It will be very interesting to be able to compare the actual with the theoretical results, if Mr. Sweetser will give us the data to do so.

J. J. S.

New Toughness Tests in Tool Steels

To the Editor: In an article in *The Iron Age* of June 9, page 1398, the writer hopefully ventured to express the belief that although absolute hardness figures—that is, figures that not only place steels in their proper order of hardness, as does the Brinell test, but that also give the hardness ratios of these different steels correctly, as the Brinell test does not—were not strictly a necessity and could well be dispensed with, yet those who desired such figures could probably find them, either in elastic limits or in bend hardness figures—pounds per square inch necessary to produce a permanent bend (or break) with supports distanced in proportion to thickness of test piece. But he wishes to say now that actual trial has shown that both these guesses were very wild ones indeed. When the bend hardness of a 0.10 carbon steel is compared with the bend hardness of a quenched and untempered high carbon steel, and we find the latter but a fraction of the former, all idea that this bend test expresses hardness is of course rudely dispelled, and we see at once that what the test really shows is what the Shore test shows (except statically instead of dynamically), and that is hardness and brittleness together, but in low carbon steels principally the former, and in very hard steels principally the latter.

But this discovery was after all the reverse of a

disappointment, for a static toughness test is, we think, more valuable than an absolute hardness test. The latter is, in fact, of no value that we can see, and to us it seems that it is rather an advantage of the Brinell test that it gives us exaggerated ratios of hardness, as it therefore shows up plainer small differences in hardness—works like a microscope, so to speak. Our bend hardness test, therefore, in showing static toughness is more valuable to us than if it showed the absolute hardness we expected it to show, and a detailed description of it seems to us worth while. We proceed as follows:

If the strip of plate to be tested is 0.09 in. thick, the supports are distanced 3 in. apart, and in any other thickness of test piece this distance is altered proportionately. Three inches (in a 0.09 in. strip) are marked off on the piece, the dimensions taken at the middle, and the surface edge of this 3 in. of the piece used as a rule to draw a lead pencil line on a sheet of paper. The piece is then laid upon the supports in the proper position and pressure applied, 20 lb. at a time, by a Riehlé machine, until comparison with the lead pencil line shows that the piece has acquired a bend. The number of pounds per square inch required to produce this bend (or break) is divided by the number required in the case of a standard 0.10 carbon test piece, and this result is set down as "bend hardness." The static hardness, also in terms of the 0.10 carbon standard, is then found by the Brinell test, and the percentage the bend hardness is of the static hardness gives us the "static toughness" figure. The "dynamic toughness" figure is found in exactly the same way, except that the Shore test is substituted for the bend test.

The underlying theory in both cases is this: The Brinell figure (the writer's figure—the number of times the sample is harder than a standard 0.10 carbon piece) does not represent all hardness, but hardness plus exaggerated ratio error. The Shore figure (also in terms of the 0.10 carbon standard) or the bend figure each represents hardness diminished by brittleness. Now, if there was no such thing as the exaggerated ratio error in the Brinell test and no such thing as brittleness in the steel, the Shore hardness and the bend hardness would both agree with the Brinell hardness. That is, they would each be 100 per cent. of the Brinell hardness. If instead of this we find they are only, say, 20 per cent. of the Brinell hardness, that means that the steel is 20 per cent. toughness (and 20 is taken as the toughness figure) and the other 80 per cent. is exaggerated ratio error and brittleness. Now, the exaggerated ratio error is greater in proportion in high than in low carbon steels. Consequently this error in the hardness operates to give precisely a similar error in the toughness figure.

That is, although steels are placed in their right order as regards toughness, the ratios will be exaggerated ones—the brittler steels will not be so much brittler as the toughness figures indicate. But this, as in the hardness figures, is not a serious matter and does not destroy the usefulness of the test.

GEORGE AUCHY.

TACONY, PHILADELPHIA, July 12, 1910.

The Thomas Steel Company, Niles, Ohio, is building an addition to its plant involving an expenditure of about $50,000. A new building, 70 x 250 ft., is being erected for use as a stock room for sheet bars. This will be equipped with a shear capable of cutting three sheet bars at a time, furnished by the United Engineering & Foundry Company, Pittsburgh, and a 15-ton crane built by the Pawling & Harnischfeger Company, Milwaukee, Wis. The McClintic-Marshall Construction Company has the contract for the building. Because of the construction work the plant was shut down June 30. Operations, however, were resumed in full July 18.

Raw Material Supplies of the Western Steel Corporation

The second cargo of iron ore and pig iron from China for the Western Steel Corporation's blast furnace and steel works plant at Irondale, Wash., leaves Hankow this month by the steamer Netherlee. Under the contract with the Han-Yeh-Ping Iron & Coal Company, which operates the Hanyang Iron & Steel Works at Hankow, China, a cargo will be sent each month for two years, after which the fleet will be increased so that three cargoes a month will be taken. The first cargo, which was unloaded at Irondale early this month, consisted of 5000 tons of Tayeh ore and 1400 tons of basic pig iron.

The Western Steel Corporation's domestic and Canadian sources of raw material, as described by the management, are stated by a Seattle newspaper to be the following: Thirty mineral claims, 1500 acres, on Quatsino Sound, Vancouver Island. Bog iron ore is delivered at the furnace at Irondale for $2 per ton, including duty. Magnetite deposits on Barclay Sound and Pitt Island, British Columbia. Same cost at furnace. Ashford coal properties at Ashford, Pierce County, 1400 acres under 99-year lease, 600 acres under 21-year lease. On Graham Island, British Columbia, 20,500 acres of coal lands. Limestone quarry in Skagit County.

It is stated that two open hearth furnaces at Irondale are now in operation and a third is under construction and that a plant will be built for the manufacture of horse shoes.

The Automobile Engineers' Convention

The Society of Automobile Engineers has issued the programme for its convention which is to be held at the Hotel Tuller, Detroit, Mich., July 28, 29 and 30. The programme is a long one, providing for the presentation of numerous papers and presenting a wide range of subjects for discussion. Among the papers named are the following:

"The Specification and Heat Treatment of Automobile Materials," by Henry Souther.

"Variation of Current Practice in Anti-Friction Bearings," by D. F. Graham.

"The Pyrometer—Its Development and Use," by W. H. Bristol.

"Testing the Hardness of Metals," by A. F. Shore and H. G. McComb.

Report of Committee on Gear Steels, by Dr. G. W. Sargent, chairman.

"How to Make Gears Quiet by Grinding," by Frederick A. Ward.

"Seamless Steel Tubes and the Necessity for Standardization in Their Specifications," by H. S. White.

"Slide, Rotary and Piston Valves versus Poppet Valves for Gas Engine Service," by Eugene P. Batzell.

"Test Data Upon Sheet Metal Frame Sections," by J. R. Smith.

The Engineers' Society of Western Pennsylvania, on invitation of officials of the Department of Public Works, Bureau of Construction of the City of Pittsburgh, the Dravo Contracting Company and the Friday Contracting Company made a visit of inspection July 16 to the Twenty-second street bridge now being built over the Monongahela River at Pittsburgh and the new concrete arch bridge being erected over Negley Run at Meadow street, Pittsburgh. The construction work at both these bridges presented features of unusual interest to engineers.

The improvements made to the Blandon Rolling Mill, Blandon, near Reading, Pa., have been completed and the mill has been put into operation again, making skelp iron.

The plant of the American Sheet & Tin Plate Company, at Muncie, Ind., is being overhauled and additional machinery placed.

Peace in the Buck's-Gompers Case

Cincinnati advices state that representatives of the Buck's Stove & Range Company of St. Louis, President Samuel Gompers of the American Federation of Labor, and representatives of the several unions having workmen at that company's plant reached an agreement on Tuesday on the case which resulted in the sentence to jail of President Gompers, John Mitchell and Frank Morrison for contempt. William H. Cribben and Thomas J. Hogan represented the company.

By the terms of the agreement, the union men say that their representatives will go to St. Louis to confer with the employers of their men within 30 days and that then the hours of labor, wages and conditions of employment will be considered.

The Buck's Stove & Range Company, through its representatives at this conference, "agrees to withdraw its attorneys from any case now pending in the courts which has grown out of the dispute between the American Federation of Labor and any of its affiliated organizations on the one hand and the Buck's Stove & Range Company on the other, and that the said company will not bring any proceedings in the courts against any individual or organizations growing out of past controversies between said company and organized labor."

Mr. Gompers states that this agreement does not alter the case against him which is now before the Supreme Court of the United States.

Labor Notes

The bi-monthly settlement of the puddling and finishing scales was made in Pittsburgh last week. The price for puddling for July and August will be based on a 1.45 cent card rate for bar iron, giving $6.12½ per ton to the puddlers employed in the bar iron mills that have signed the new Amalgamated scale. Mills that have not signed the Amalgamated scale, including those in the Western Bar Iron Association, will pay the old rate of $5.62½ for puddling until a settlement of the scale is reached. None of the bar iron mills of the Republic Iron & Steel Company is running at present.

The following have signed the wage scales of the Amalgamated Association for the coming year:

Whitaker-Glessner Company, Wheeling, W. Va., and Martins Ferry, Ohio.
National Enameling & Stamping Company, Granite City, Ill., and St. Louis, Mo.
American Rolling Mill Company, Middletown, Ohio.
Carnahan Tin Plate & Sheet Company, Canton, Ohio.
Newport Rolling Mill Company, Newport, Ky.
Pope Tin Plate Company, Steubenville, Ohio.
Atlanta Tin Plate & Sheet Mill, Atlanta, Ga.
Follansbee Brothers Company, Follansbee, W. Va.
Empire Iron & Steel Company, Niles, Ohio.
Thomas Steel Company, Niles, Ohio.
De Forest Sheet & Tin Plate Company, Niles, Ohio.
Zug Iron & Steel Company, Pittsburgh, Pa.
Youngstown Roofing Company, Youngstown, Ohio.
N. & G. Taylor Company, Cumberland, Md.
Top Mill Sheet Mill, Wheeling, W. Va.
Licking Rolling Mill Company, Covington, Ky.
Joliet Iron Products Company, Joliet, Ill.
Texas Rolling Mill Company, Fort Worth, Texas.
Cleveland Hardware Company, Cleveland, Ohio.
Judson Mfg. Company, Oakland, Cal.

The Van Camp Hardware & Iron Company, Indianapolis, Ind., has increased its capital stock to $400,000. Three new stockholders have been admitted—George S. Winders, sales manager for the company, and J. A. Schlueter and A. R. Dewey, who have been connected for many years with a large iron and hardware house in Louisville. The addition of $100,000 to the capital stock was made necessary by the increased business. The company was organized in 1876 and has grown steadily. Beginning in a building with 12,000 ft. of floor space, changes were made at intervals to larger buildings until it reached its present eight-story home, with nine acres of floor space, built in 1906. It is one of the largest buildings in the country occupied exclusively for the hardware and iron business. The company also maintains 11 warehouses.

Lehigh Valley Freight Rates on Coal

Considerable interest has been aroused in Pennsylvania in regard to a possible test of the powers of the State Railroad Commission as a result of the notice given to the commission by the Lehigh Valley Railroad Company that it is not its purpose to comply with a recommendation of the commission that it readjust its rates for transportation of coal in the Lehigh Valley. This is the first instance wherein a railroad company has declined to accede to a recommendation of the commission, which has passed upon scores of cases involving rates charged by railroads for hauling coal, ore, iron and steel products and various manufactures. It is taken to mean that the commission will invoke the aid of the Attorney-General's department, which, under section 17 of the act of May 31, 1907, it is empowered to do through the Secretary of Internal Affairs.

The recommendation came after a complaint which attracted unusual attention. The Coplay Cement Mfg. Company protested against being compelled to pay 90 cents a ton for a haulage of coal about 21½ miles, setting forth that steel companies, foundry companies and other corporations having plants situated at a greater distance from the mines were not proportionately charged by the Lehigh Valley Railroad Company. The company replied that it was acting in a manner to enable it to supply its customers and to maintain competition with other manufacturing districts. The commission set this aside and contended that the section of the State constitution prohibiting discrimination in charges was being violated The commission will shortly meet to consider the matter.

A Decision on Moa Iron Mining Claims in Cuba

In the litigation between McLoughlin Brothers, New York, and the Juragua Iron Company (Bethlehem Steel Company), the Supreme Court of Cuba has recently given a decision in favor of the former, affirming their title to 11 mining claims of about 1100 hectares in the Moa district of northern Cuba. The claims are adjacent to the coast at the Bay of Moa, and the ore they contain is said to be the characteristic iron ore of the Moa district, low in phosphorus and sulphur. The amount of ore involved in this litigation is unknown, as there has been no thorough exploration. The original suit was begun by McLoughlin Brothers to enforce their "derecho de tanteo," or the right given under the Spanish law by which a partner has preference over an outsider in the purchase of a partner's interest. Under it a partner, within nine days after a conveyance to an outsider of any interest in the common property is filed by another partner, may deposit in court the purchase price, together with security for expenses of transfer, and may have the property deeded to him instead of to the outside purchaser. The above mentioned case passed from the court of first instance to the intermediate court and finally to the Supreme Court, the decision being uniformly in favor of the plaintiff's contention.

Charles A. Bookwalter, receiver of the Technical Institute, Indianapolis, Ind., has sent out letters announcing the usual fall term for the machinists' and molders' schools and the departments of lithography, printing and pharmacy. Ninety students are now attending the summer term of these schools.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	July 20, 1910.	July 13, 1910.	June 22, 1910.	July 21, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	*$16.25*	$16.25	$16.50	$16.50
Foundry No. 2, Southern, Cincinnati	14.75	14.75	14.75	15.75
Foundry No. 2, local, Chicago	*16.50*	16.50	16.75	17.00
Basic, delivered, eastern Pa.	*15.75*	15.75	16.00	16.00
Basic, Valley furnace	14.50	14.50	14.50	15.00
Bessemer, Pittsburgh	16.40	16.40	16.40	16.40
Gray forge, Pittsburgh	*14.40*	14.40	14.90	14.90
Lake Superior charcoal, Chicago	18.50	18.50	18.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	25.00	25.00	25.00	24.00
Forging billets, Pittsburgh	*30.00*	30.00	31.00	28.00
Open hearth billets, Philadelphia	28.50	28.50	28.50	25.50
Wire rods, Pittsburgh	*29.00*	29.00	31.00	29.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	*13.00*	13.00	14.00	14.50
Steel rails, melting, Philadelphia	*14.00*	14.25	14.50	16.00
Iron rails, Chicago	*16.75*	16.75	17.00	17.00
Iron rails, Philadelphia	*18.50*	19.00	19.50	19.50
Car wheels, Chicago	*14.75*	14.75	15.50	16.00
Car wheels, Philadelphia	*14.00*	14.50	15.00	15.00
Heavy steel scrap, Pittsburgh	*14.50*	14.50	15.00	16.00
Heavy steel scrap, Chicago	*12.25*	12.25	13.00	14.00
Heavy steel scrap, Philadelphia	*14.00*	14.25	14.50	16.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	*1.45*	1.47½	1.47½	1.45
Common iron bars, Chicago	*1.40*	1.40	1.45	1.35
Common iron bars, Pittsburgh	1.50	1.50	1.50	1.45
Steel bars, tidewater, New York	1.61	1.61	1.61	1.46
Steel bars, Pittsburgh	1.45	1.45	1.45	1.30
Tank plates, tidewater, New York	*1.56*	1.56	1.61	1.51
Tank plates, Pittsburgh	*1.40*	1.40	1.45	1.35
Beams, tidewater, New York	*1.56*	1.56	1.61	1.51
Beams, Pittsburgh	*1.40*	1.40	1.45	1.35
Angles, tidewater, New York	*1.56*	1.56	1.61	1.51
Angles, Pittsburgh	*1.40*	1.40	1.45	1.35
Skelp, grooved steel, Pittsburgh	1.50	1.50	1.50	1.35
Skelp, sheared steel, Pittsburgh	1.60	1.60	1.60	1.45
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	*2.30*	2.30	2.40	2.20
Wire nails, Pittsburgh*	*1.70*	1.80	1.80	1.70
Cut nails, Pittsburgh	*1.65*	1.70	1.75	1.70
Barb wire, galv., Pittsburgh*	*2.00*	2.10	2.10	2.00
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	*12.62½*	12.62½	12.75	13.50
Electrolytic copper, New York	*12.25*	12.37½	12.50	13.00
Spelter, New York	**5.20**	5.20	5.15	5.35
Spelter, St. Louis	**5.05**	5.05	5.00	5.27½
Lead, New York	**4.40**	4.40	4.37½	4.35
Lead, St. Louis	**4.25**	4.25	4.22½	4.20
Tin, New York	**33.25**	32.65	32.60	29.00
Antimony, Hallett, New York	*8.00*	8.12½	8.12½	7.50
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.84	$3.64

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.55c., net; H-beams over 8 in., 1.65c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.50c., net; angles, over 6 in., 1.55c., net; angles, 3 x 3 in., and up, less than ¼ in., 1.65c., base, half extras, steel bar card; tees, 3 in. and up, 1.55c., net; zees, 3 in. and up, 1.50c., net; angles, channels and tees, under 3 in., 1.40c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.75c., net; hand rail tees, 2.75c., net; checkered and corrugated plates, 2.75c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 and 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.20c.; No. 28, 3.40c.; No. 29, 3.50c.; No. 30, 3.75c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe now in effect:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in.	70	54	66	..
⅜ in.	71	57	67	53
½ in.	74	62	70	58
¾ to 6 in.	78	68	74	64
7 to 12 in.	72	57	68	53
Plugged and Reamed.				
1 to 4 in.	76	66	72	62
Extra Strong, Plain Ends.				
⅛ to ⅜ in.	63	51	59	47
½ to 4 in.	70	58	66	54
4½ to 8 in.	66	54	62	50
9, 10, 11 and 12 in.	54	42	..	..
Double Extra Strong, Plain Ends.				
½ to 8 in.	59	48	55	44

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1¼ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 3 in.	69	55
6 to 13 in.	61	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $29.

Steel Rivets.—Structural rivets, ¾-in. and larger, 2.15c., base; cone head boiler rivets, ¾-in. and larger, 2.25c., base; ⅝-in. and 11-16-in. take an advance of 15c., and ½-in. and 9-16-in. take an advance of 50c.; in lengths shorter than 1-in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

THE IRON AND METAL MARKETS

Pittsburgh

PARK BUILDING, July 20, 1910.—(*By Telegraph.*)

Pig Iron.—The only important transaction of the week was the purchase by a Kentucky steel interest of about 5000 tons of basic iron for remainder of the year delivery from Columbus, Ohio, furnaces and 3000 to 4000 tons of Bessemer for the same delivery from Ashland, Ky., furnaces. Prices paid are not disclosed, but are known to be low. The general pig iron market is quiet, with little new inquiry. Consumers seem to be waiting for still lower prices, in spite of the fact that to-day's figures on pig iron are below cost to furnaces that buy their ore and coke. We quote standard Bessemer iron at $15.50; basic, $14.50; malleable Bessemer $14.75; No. 2 foundry, $14.25, and gray forge, $13.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90 cents a ton.

Steel.—Not much inquiry is in the market, the continued decline in prices of steel in the past few months causing buyers to hold off in the belief that the market may go still lower. We quote Bessemer billets, 4 x 4 in., $25; Bessemer sheet bars in random lengths, $26; 4 x 4 in. open hearth billets, $26 to $26.50; open hearth small billets, $27 to $27.50; open hearth sheet and tin bars, $27 to $27.50, and forging billets, $30 to $31, all f.o.b. Pittsburgh, Wheeling or Youngstown district, with freight to point of delivery added.

(*By Mail.*)

Nothing of special moment has developed in the iron trade within the past week, the whole market being quiet and without special feature. The main disturbing factor in the situation is the pig iron market, which continues heavy, the output being considerably in excess of consumption, while prices are weak. The nominal price of Bessemer iron is $15.50 at Valley furnace, but very little business is offering. Basic iron is also weak, and reports are that $14.25 at Valley furnace, or very close to that figure, has been done. The steel market is dull and on a firm offer open hearth billets could be bought at $26, Pittsburgh. For several weeks prices on finished material have shown a declining tendency, and the reduction of $2 a ton made on wire products, effective from July 13, was the natural result of cutting in prices, and was done to put the wire market on a more stable basis. Structural material, tin plate and lap weld sizes of pipe are the most active items on the whole list of finished iron and steel, but other materials, such as sheets, wire products, small sizes of pipe and scrap and coke are dull, with prices tending downward. An official reduction in price of sheets, to meet the competition of the aggressive mills that has been going on for some time, may possibly be made within a short time. Buyers at present are pursuing a very conservative policy in making purchases, and are confining orders almost entirely to small lots to cover actual needs, but it is believed that early in September, if not before that time, there will be a better demand. The favorable crop reports of the past week are expected to have a decisive influence in bringing this about.

Ferromanganese.—The market is practically bare of new inquiries, and prices on the whole are weak. We quote 80 per cent. foreign, for delivery over the remainder of this year, at $39 to $39.50, Baltimore, the freight rate to Pittsburgh being $1.90 a ton.

Ferrosilicon.—There is little new inquiry, consumers being covered for a considerable period ahead. Prices are only fairly strong. We quote 50 per cent. ferrosilicon at $57.50 to $58, delivered, Pittsburgh. We quote 10 per cent. at $23; 11 per cent., $24, and 12 per cent., $25, all at Ashland furnace, to which $1.90 a ton should be added for delivery in the Pittsburgh district.

Rods.—Effective July 13, the leading makers of rods made a reduction of $2 a ton, putting Bessemer, open hearth and chain rods at $29, Pittsburgh. The Jones & Laughlin Steel Company has about completed the building of its new rod mill at Aliquippa and is now a factor in the rod market and actively seeking contracts. It is probable that this new mill, which will have a daily capacity of about 300 tons, will be put in operation not later than August 15. We quote Bessemer, open hearth and chain rods at $29, Pittsburgh.

Skelp.—Owing to recent heavy inquiry and the shutdown of a number of puddling furnaces in the Central West on account of the puddling scale not being settled, there is a decided scarcity in grooved and sheared iron plates, and mills that are in position to furnish these are asking higher prices. For ordinary widths and gauges we quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.80c., and sheared iron skelp, 1.90c., all f.o.b. mill, Pittsburgh.

Steel Rails.—Reports that the Carnegie Steel Company had taken a contract for 1000 tons of standard sections for the Baltimore & Ohio Railroad are officially denied. The company has taken a good deal of business in the past week in light rails, entering new orders for considerably over 5000 tons and also receiving excellent specifications against contracts. We quote steel axles at 1.75c. to 1.80c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 to 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Structural Material.—The biggest job in the market at present is the Quebec Bridge, bids for which are to be opened September 1. It is probable that both leading local fabricating interests will bid on this work, which will take 60,000 to 70,000 tons. New inquiries in the local structural trade are numerous, and one local fabricator is so well filled up with work that it has recently returned four or five signed contracts, being unable to make the deliveries wanted by its customers. We quote beams and channels up to 15 in. at 1.40c. to 1.45c., f.o.b. Pittsburgh.

Plates.—The American Shipbuilding Company has taken a contract for a 10,000-ton bulk freighter to replace the steamer Frank H. Goodyear, which was lost in a collision on Lake Huron some months ago. The new boat is to be ready for spring trade. The Toledo Shipbuilding Company is assembling material for a new ferry steamer for the Ann Arbor Railroad. The plates and shapes for these two boats, 6000 to 7000 tons, will probably be rolled by the Carnegie Steel Company. The Baltimore & Ohio Railroad has placed an order with the Pressed Steel Car Company for 1000 steel gondola cars. The latter company is now making deliveries at the rate of four or five a day of steel passenger cars for the Interborough Company, New York City, the order calling for 175 cars of this type. The inquiry for steel cars is very light. A number of railroads have recalled inquiries and are holding off placing orders until the political situation is clearer, and crop reports are more reassuring. However, the leading mills are pretty well filled up for the next few months, and are running to nearly full capacity. We quote ¼-in. and heavier plates at 1.40c. to 1.45c., Pittsburgh.

Sheets.—A process of liquidation is going on in the sheet trade. Most of the mills are cutting prices on light gauge black sheets about $3 a ton, and on galvanized sheets about $4 a ton to jobbers, which concessions in turn are given to their customers. This is being done to allow both the sheet mills and jobbers to work off the heavy stocks they now have on hand. These cuts may possibly lead to a readjustment in prices of sheets later on, but nothing official as to this has been given out. The demand for blue annealed and electrical sheets keeps up well, and on these grades the mills are quite busy. Regular prices on sheets, which, however, do not now represent the actual market, are based on 2.40c. for No. 28 black and 3.50c. for No. 30.

Tin Plate.—The tin plate trade is in splendid condition, the new demand being fairly large, while consumers are specifying actively against their contracts. The vegetable canneries expect to use more tin cans this season than ever before in the history of the tin plate trade. Heavy demands are being made on the mills for shipments, and consumers of tin plate are not able to get it as fast as needed. Prices are very firm, and we continue to quote on the basis of $3.60 for 100 lb. cokes per base box f.o.b., Pittsburgh.

Bars.—Several of the leading steel bar mills state that specifications are already coming in on the contracts placed by implement makers and wagon builders in the latter part of May and early in June. The Republic Iron & Steel Company is having a conference to-day with the Amalgamated Association on the puddling scale and a settlement may possibly be reached. As yet no agreement has been made on the puddling and finishing scales between the Western Bar Iron Association and the Amalgamated Association, but another conference will very likely be held soon after the meeting with the Republic Iron & Steel Company has been concluded. A good many puddling plants in the Central West are closed down pending settlement of the wage scale. The demand for iron bars is only fair, and specifications against contracts are not being received at a very satisfactory rate. We quote steel bars at 1.45c. and iron bars at 1.50c., f.o.b., Pittsburgh.

Spelter.—Inquiry in the past week or two has been better, and prices are a shade firmer. We quote prime grades of Western at 5c. to 5.02½c., f.o.b. East St. Louis, equal to 5.12½c. and 5.15c., Pittsburgh.

THE IRON AND METAL MARKETS

Hoops and Bands.—The new demand is only fair, but buyers are specifying quite liberally against contracts, some of which were made since July 1, and others that were held over from second quarter. We quote steel hoops for forward delivery at 1.50c. to 1.55c. and steel bands at 1.45c. to 1.50c., f.o.b. Pittsburgh, extras as per the steel bar card applying on the latter.

Spikes.—New buying of railroad spikes is confined almost exclusively to small lots for repair work, no large contracts for forward delivery having been placed in this market for some time. The demand for small railroad and boat spikes continues fairly active, and the makers are quite busy on these grades. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at 1.55c. to 1.60c. for Western shipment and 1.60c. to 1.65c. for local trade. Boat and small railroad spikes are lower in price and we quote these at 1.65c. to 1.70c., base, these prices being for carload and larger lots.

Rivets.—The demand, while only fair, is showing some improvement over June, while specifications on contracts are reported as coming in quite well. Official prices on structural rivets are 2.15c. and on boiler rivets 2.25c., f.o.b. Pittsburgh, but on desirable orders these prices are shaded.

Shafting.—The new demand is not so active as some time ago, but specifications on contracts, especially from the automobile builders, are quite heavy. The shafting makers have been able in the past month to catch up on deliveries to some extent, having been very much behind for some time. Regular discounts on shafting are 55 per cent. off in carload and larger lots and 50 per cent. off in small lots, delivered in base territory. For desirable specifications the carload price of 55 per cent. off is sometimes shaded to the extent of about 55 and 5 off.

Wire Products.—As a natural outcome in the cutting of prices in wire products that has been going on for some time, the leading makers announced a reduction of $2 a ton, effective from July 13, and as a result a good many contracts have been placed for wire nails and wire for shipment within 60 days from date of contract. It is believed that the demand, as a result of the reduction in price, will be more active on all kinds of wire products. We have reduced prices $2 a ton and now quote galvanized barb wire at $2; painted, $1.75; annealed fence wire, $1.50; galvanized, $1.80; wire nails, $1.70, and cut nails $1.65 to $1.70 in carload and larger lots, all f.o.b., Pittsburgh, freight to destination added.

Merchant Pipe.—No additional large contracts for line pipe have been placed since our last report, but several very heavy inquiries are in the market, and it is believed will develop into actual orders within a short time. The production of fuel oil in the California fields is enormous, and it is evident that a number of the producers there will have to build pipe lines to take care of their output. The demand for butt weld sizes continues light and has been for some months. Stocks of pipe held by the mills and by jobbers are still quite heavy. It is stated that discounts on both iron and steel pipe, printed on another page in this issue, are being fairly well maintained.

Boiler Tubes.—The demand for locomotive tubes has been quite active for some time, and the mills are pretty well filled up for several months. Merchant tubes are only in fair demand and discounts printed on a previous page are still more or less shaded.

Iron and Steel Scrap.—This material continues very quiet, with prices tending downward. A number of mills that are large users of scrap are still closed down pending settlement of the wage scales, and this is restricting consumption to a considerable extent. It is believed that the scrap trade will not show much improvement while the heavy stocks and low prices of pig iron continue to hang over the market. Dealers quote about as follows, per gross ton, for delivery at Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$14.50 to $14.75
No. 1 foundry cast	14.25 to 14.50
No. 2 foundry cast	13.25 to 13.50
Bundled sheet scrap, at point of shipment	10.25 to 10.50
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	16.00 to 16.25
No. 1 railroad malleable scrap	14.00 to 14.25
Grate bars	11.00 to 11.25
Low phosphorus melting stock	18.00 to 18.50
Iron car axles	25.00 to 25.25
Steel car axles	21.00 to 21.25
Locomotive axles	26.00 to 26.25
No. 1 busheling scrap	13.00 to 13.25
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	14.50 to 14.75
Sheet bar crop ends, shipping point	16.75 to 17.00
Cast iron borings	8.00 to 8.25
Machine shop turnings	9.50 to 9.75

Coke.—The Westinghouse Electric & Mfg. Company closed last week on its inquiry of 12,000 to 15,000tons of foundry coke for delivery over the remainder of the year, the price reported being a shade under $2.25 per net ton, at oven. Several other large inquiries for foundry coke are in the market, and considerable business for delivery over the last half of the year has been closed in this market recently. We quote best grades of furnace coke running under 1 per cent. in sulphur for delivery over last half of the year at $1.80 to $1.85, and best grades of 72-hour foundry coke at $2.15 up to $2.40 per net ton at oven for same delivery. Furnace coke loaded on cars which has to be moved is being offered at $1.65 to $1.70 for best grades.

Chicago

FISHER BUILDING, July 20, 1910.—(*By Telegraph.*)

The market is quiet and featureless, as buyers have generally covered their requirements for some time ahead, and while there is some new business, the volume is not large. This is a natural condition of the market in July and does not indicate any notable weakness in conditions. General business on the whole is good through the West and agricultural conditions are far better from an average point of view than some of the market reports would indicate. The farmers, in fact, are so prosperous that they are buying for cash the greater portion of the output of the automobile industry, and the only crop advices that are really unfavorable are from the Northwest, where spring wheat is short. An indication of the course of general business is that the purchase of small lots of iron and steel from store continues on a very satisfactory basis. Individual orders are not so large as last winter, but there are more of these orders and they come from a broader field. The lack of car orders from the railroads has a depressing effect on the market for plates and structural shapes, but there is a good run of building contracts. Prices of wire products are weakening as a result of larger production rather than any drop in the demand. The nominal concessions that have been reported in black and galvanized sheets are merely a reversion to the prices at which most of the business done during the first half of the year was taken. Merchant mill products remain firm. There is a good run of new business in concrete bars as a result of which one of the hard steel bar mills in this district resumed operations Monday and another will resume next Monday. From a broad point of view the iron and steel business has become a buyers' market, not because of any notable decrease in consumption, but because production has increased to so great an extent in the past four years that the market is saturated during a year of large consumption. This has necessitated a readjustment to the prospect of smaller margins of profit in the production of iron and steel.

Pig Iron.—Allowing for the advance in wages last spring, Southern iron is now selling relatively lower than the lowest point touched in this market last year. Making the same allowance for the higher cost of Northern ore and labor, the Northern market is also relatively lower. There have been a few inquiries for delivery beyond January 1, and some Northern iron has been sold on terms running over into next year. The Southern interests are generally holding off on sales beyond the end of the year and are not making any aggressive effort to sell for last quarter. Meantime stocks are accumulating and the foundry and manufacturing interests are very indifferent regarding their requirements for the future so long as they are covered for three or four months. The enormous increase in furnace production and capacity may have the effect of bringing the pig iron market down for some time to a basis of buying for near delivery instead of the old custom of contracting for six months' or a year's requirements. There are scattering inquiries for 500-ton lots of malleable Bessemer and small lots are being sold right along, covering nearly all grades of Northern and Southern. The following prices are for July, August and September, Chicago delivery:

Lake Superior charcoal	$18.50 to $19.00
Northern coke foundry, No. 1	17.00 to 17.50
Northern coke foundry, No. 2	16.50 to 17.00
Northern coke foundry, No. 3	16.25 to 16.50
Northern Scotch, No. 1	17.50 to 18.00
Southern coke, No. 1	16.35 to 16.85
Southern coke, No. 2	15.85 to 16.35
Southern coke, No. 3	15.60 to 16.10
Southern coke, No. 4	15.35 to 15.85
Southern coke, No. 1 soft	16.35 to 16.85
Southern coke, No. 2 soft	15.85 to 16.35
Southern gray forge	15.10 to 15.60
Southern mottled	14.85 to 15.35
Malleable Bessemer	16.50 to 17.00
Standard Bessemer	18.40 to 18.90
Jackson Co. and Kentucky silvery, 6%	19.40 to 19.90
Jackson Co. and Kentucky silvery, 8%	20.40 to 20.90
Jackson Co. and Kentucky silvery, 10%	21.40 to 21.90

(*By Mail.*)

Billets.—There are only a few buyers in the Chicago district whose requirements run into any considerable tonnage, and their business is generally based on Pittsburgh prices. The mills in this district have not had billets to offer openly for a long time, but the Inland Steel Company may become a seller of billets when its two new open hearth furnaces

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come in. Construction on these furnaces has been delayed by the strike of the structural iron workers, but they are expected to be completed by August 1.

Rails and Track Supplies.—This is the quiet season of the year in rail orders, current business being represented by small orders by minor railroads. The market is a little weaker on track supplies, in sympathy with general conditions, but Chicago mills have had a heavy run of business this year. We quote standard railroad spikes at 1.75c. to 1.85c., base; track bolts with square nuts, 2.40c. to 2.50c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $27; 30 to 35 lb., $27.50; 16, 20 and 25 lb., $28; 12 lb., $29, Chicago.

Structural Material.—While the market for plain material has declined, there was a good run of structural business last week. The Minneapolis Steel & Machinery Company booked contracts for a church building at Boise, Idaho, and a bakery and some small bridges in Denver amounting to 250 tons. A contract for 250 tons of work for the Western Sugar Company, San Francisco, was taken by the Pacific Rolling Mill Company of that city. The Nicalaus Building at Sacramento, Cal., 190 tons, was taken by Millikin Brothers. The Athletic Club at Los Angeles, Cal., 2300 tons, was booked by the Llewellyn Iron Works. Buildings for the Kempsmith Machine Company, Milwaukee, Wis., 200 tons, will be erected by Heil & Company, Milwaukee. Contracts for buildings which will require 1400 tons, for the Oliver Chilled Plow Works, South Bend, Ind., were closed by the Indiana Bridge Company, Muncie, Ind. Prices are quoted $1 a ton lower on plain material. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.90c. to 2c., Chicago.

Plates.—The lack of inquiries from railroads for cars is having a weakening effect on the plate market, as car business furnishes the principal tonnage for the plate mills. Crop conditions in the West, however, will undoubtedly bring in new car business in the near future. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.90c. to 2c., Chicago.

Sheets.—The demand for blue annealed sheets is keeping up at a rate which holds prices firm, but the weakness in black and galvanized sheets is so persistent that the mill price quoted below is reduced 10c. this week on black sheets and 15c. on galvanized. The Inland Steel Company now has its full plant of 18 sheet mills in operation at Indiana Harbor. We quote as follows, Chicago: No. 10 annealed, 1.93c.; No. 28 black, 2.48c.; No. 28 galvanized, 3.53c. Prices from store, Chicago, are: No. 10 blue annealed, 2.20c. to 2.30c.; No. 28 black, 3c. to 3.10c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—Soft steel bars are now commanding a higher price in the market than plates or structural material. The mills are well covered with specifications for agricultural bars. Concrete construction is also keeping up in good demand for hard steel bars, on which the price is well maintained, although the raw material has gone off about $3 a ton since last winter. In bar iron the situation is quiet. There are inquiries in the market for over 10,000 tons, chiefly from railroads, but the mills hesitate to make contracts for the last half at current prices, which are based on scrap prices for early delivery. Subject to the usual delay in delivery of soft steel bars, we quote as follows: Soft steel bars, 1.63c. to 1.68c.; bar iron, 1.40c. to 1.45c.; hard steel bars rolled from old rails, 1.50c. to 1.60c., all Chicago.

Rods and Wire.—Some of the daily papers have reported a reduction of 15c. in wire prices, but this is not confirmed from official sources. The official price, however, has become nominal and jobbing or industrial buyers who inquire for any considerable quantity can do 1.73c., Chicago, on annealed wire and 1.93c. on wire nails or painted barbed wire. Galvanized products usually take 30c. more than the plain material. The wire interests seem disposed to meet competition. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Merchant Steel.—A very satisfactory feature of the market is the demand for merchant mill products from store. While the average order does not call for so large a quantity as last winter, the number of orders is larger and the business is not swelled now by distress purchases from the manufacturers who were short on deliveries from mill during the winter. The business at the present time is well distributed and covers practically every form of merchant steel.

Cast Iron Pipe.—The market is relatively quiet, the largest pending business being the items reported at Cheyenne, Wyo., 3000 tons, to be let this week. Decatur, Ill., is in the market for 500 tons. Waterloo, Wis., has awarded a letting of 375 tons to the Lynchburg Foundry Company, Lynchburg, Va. Railroad specifications are running light, but there is a fair amount of current business in gas pipe as well as small lots of water pipe. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28; 6 to 12 in., $27; 16-in. and up, $26, with $1 extra for gas pipe.

Old Material.—Prices are generally very weak and dealers report the market dull. The rolling mills are booking very little new business for deferred deliveries and are therefor indifferent to the bargains offered them in wrought grades of scrap and other material for rolling mills. Steel scrap is also weak and dealers have trouble in placing their offerings excepting where they have old contracts. One of the local mills recently bought a round lot of rerolling rails at $15.85 delivered, the lowest price for this material since last summer. One of the leading railroads sold 1,000 tons of No. 1 wrought last week at $12.75, railroad malleable on the same list going at $11.50, long rails at $16, short rails at $13.50, and frogs, switches and guards at $13. These are better prices than dealers are able to get on new business and it is the general opinion that the material on which railroads have been getting better than market prices recently is being taken to cover old contracts with consumers. The large offerings by railroads in the past couple of months are not creating as much pressure on the market as might have been expected and it is believed that the dealers who have handled this large tonnage of material have generally protected themselves by contracts with their customers before submitting their bids to the railroads. One road sold 1000 tons of car wheels last week at $14.25 to $14.50, equal to $14.75 to $15 delivered. Another road is offering 1500 tons of old car wheels by special circular, bids to close this week. The car wheel foundries are generally carrying large stocks of old wheels and are not in the market except when forced to buy in order to protect their stocks. Malleable scrap is very hard to dispose of, but there is a fair demand for No. 1 cast. Following prices are per gross ton, delivered, Chicago:

Old iron rails	$16.75 to $17.25
Old steel rails, rerolling	15.75 to 16.25
Old steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard sections, subject to inspection	24.00 to 25.00
Old car wheels	14.75 to 15.25
Heavy melting steel scrap	12.25 to 12.75
Frogs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	11.75 to 12.25

The following quotations are per net ton:

Iron angles and splice bars	$14.50 to $15.00
Iron car axles	19.50 to 20.00
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Springs, knuckles and couplers	11.50 to 12.00
Locomotive tires, smooth	17.00 to 17.50
No. 1 dealers' forge	11.00 to 11.50
Steel axle turnings	9.00 to 9.50
Machine shop turnings	7.25 to 7.75
Cast and mixed borings	4.50 to 5.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	9.00 to 9.50
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	11.00 to 11.50
Railroad malleable	11.25 to 11.50
Agricultural malleable	10.75 to 11.00
Pipes and flues	9.50 to 10.00

Philadelphia

PHILADELPHIA, PA., July 19, 1910.

Continued dullness characterizes the market in practically all lines, the trade showing but little interest in the situation and appearing satisfied to let business drift along pending further developments. There has been no movement worth mentioning in pig iron. Occasional moderate lots of foundry iron are sold at unchanged prices, but very little business has been done in the other grades. Weakness in prices of some classes of finished materials holds back business in those lines. Lower prices are being named for plates and shapes by some mills, particularly when competition is sharp, but consumers are waiting for the market to settle before placing business of any importance. Specifications on old orders, however, are coming out freely, as a rule, and enable mills to maintain about an even productive capacity. Considerable business in plates and shapes is being figured on, but under the circumstances it closes slowly. A very light demand for billets is reported. Sheets, however, show increasing activity at unchanged prices. Old material is quiet, with small transactions at somewhat lower prices.

Pig Iron.—Sales during the week have been small, neither buyer nor seller showing any marked interest in the market, which drifts along without any particular feature, both sides waiting further developments. The continued offerings of low price sellers, largely on the part of producers outside the territory, keep the market upset and make it difficult for others to maintain prices. Few of the furnaces in this territory show a willingness to meet quotations below $16.25,

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delivered, for No. 2 X foundry, for shipment during the last half, but that figure has been shaded. Some fair inquiry is still before the trade, and one consumer is in the market for a good sized lot for first half of 1911 shipment, on which the majority of producers refuse to quote. Few large lots for this year's delivery are to be noted, except for low grade iron, for which there has been some further demand on the part of the cast iron pipe foundries. That for some 5000 to 6000 tons, referred to last week, is understood to be still unclosed. In the higher foundry grades sales have been considerably scattered; aggregate sales of some 1200 to 1500 tons, covering different grades, to Baltimore, Md., foundries, are reported. In this immediate vicinity sales have been mostly in small lots and even these have, some sellers report, been fewer in number. Standard brands of Eastern Pennsylvania No. 2 X foundry are selling at $16.25 to $16.50, delivered in this vicinity, at which the majority of producers have prices pegged. Cast iron pipe foundries have purchased low grade iron at prices ranging from $15 to $15.25, delivered. Virginia No. 2 X foundry can be had at $13.50, furnace, for third quarter, and in some instances for last half delivery, although other sellers maintain a $13.75, furnace, basis for third quarter, at which prices scattered sales are reported. One sale of 300 tons of No. 2 X for second half delivery is reported at $14, furnace. Very little movement is to be noted in forge iron. A sale of a few hundred tons for rolling mill purposes was made last week at a shade under $15.50, delivered. The steel making grades are inactive. An inquiry for a few thousand tons of special basic is reported, but consumers in this territory show no interest in the market and sellers make no effort to force business. Standard low phosphorus iron has been sold in small lots at $22.50 to $23, delivered. This grade continues the strongest on the list. While the range of prices is practically unchanged, occasional transactions at concessions are reported, the following quotations, however, about represent the open market for standard brands delivered in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry	$16.25 to $16.50
Eastern Pennsylvania, No. 2 plain	16.00 to 16.25
Virginia, No. 2 X foundry	16.25 to 16.75
Virginia, No. 2 plain	16.25 to 16.50
Gray forge	15.50
Basic	15.75
Standard low phosphorus	22.50 to 23.00

Ferromanganese.—Moderate inquiry from Western consumers is reported. In this territory, however, no fresh business has developed. Prices are nominally $39.50 to $40, Baltimore, for 80 per cent. ferro, although some sellers refuse to meet that level.

Billets.—The situation remains quiet. Very little demand beyond that for occasional small lots has developed in this district. The reported uncertainty in prices has not yet effected the situation in this territory, makers naming $28.50 to $29, delivered here, for ordinary open hearth rolling billets, and $31 to $32, at mill, for forging billets, the usual extras applying for high carbons and special sizes. Odd lots can probably be had at a concession, while it is intimated that a shade less might be done for desirable orders for large lots.

Plates.—Price uncertainties have influenced the market to some extent, and, while there is a fair volume of business from small and regular customers, usually at 1.60c. to 1.65c., delivered, for ordinary plates, this price has been shaded by some mills, and on a desirable order for several hundred tons and upward 1.55c. can be done. The larger buyers, however, are not placing business freely, awaiting a more stable price level. Specifications on orders in hand are reported as coming in very freely, so that mills have little difficulty in maintaining an even productive capacity. Current orders are largely of a miscellaneous character, although some fair business is being figured on.

Structural Material.—There has been no particular increase in the demand. Fresh inquiries are mostly of the smaller character, although several buildings in Baltimore, aggregating probably 1200 to 1500 tons, together with a fair amount of shapes for ship and bridge building, are being figured on. A very good run of specifications is reported by Eastern mills, a number of which still have considerable business on their books. Prices are not strong, and, while 1.60c. represents about the average for plain shapes delivered in this territory, 1.55c., delivered, can be done for desirable orders.

Sheets.—Mills accumulated sufficient orders during the recent suspension to enable them to start up at full capacity, and as a very satisfactory volume of day to day business continues to come out, makers in this territory take a rather optimistic view of the situation. Prices are unchanged and comparatively firm at the following range: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3c.; No. 27, 3.10c.; No. 28, 3.20c.

Bars.—The refined iron bar market is a shade weaker. The absence of any pronounced inquiry has made some mills more anxious for what little business there is offered, and prices are a trifle lower, 1.45c. to 1.55c. about representing the market for refined iron bars, delivered in this territory. Steel bars are unchanged, at 1.60c., delivered, mills being pretty well supplied with orders.

Coke.—The bulk of the business has been in the foundry grade, although there has been some inquiry for spot furnace coke. Prices are a trifle firmer, and some producers, being pretty well sold up, have practically withdrawn from the market. Standard foundry coke is quoted at $2.25 to $2.50, at ovens, furnace coke ranging from $1.65 to $1.85, at ovens, dependent on delivery. The following range represents quotations per net ton, delivered in buyers' yards in this vicinity:

Connellsville furnace coke	$4.00 to $4.15
Foundry coke	4.50 to 4.75
Mountain furnace coke	3.60 to 3.75
Foundry coke	4.10 to 4.35

Old Material.—Consumers for the most part are pretty well supplied as to their near future scrap requirements and show little interest in the market. The few sales made recently have usually gone at somewhat easier prices. The associated mills will not offer over $14 for No. 1 heavy melting steel and $16 for No. 1 railroad wrought, but are making no important purchases. Outside interests would probably pay a shade more, but are not making purchases. The market has been bare of transactions in some grades and quotations continue largely nominal. The following range about represents bids and offers for deliveries in buyers' yards in this vicinity:

No. 1 steel scrap and crops	$14.00 to $14.25
Old steel rails, rerolling	15.75 to 16.25
Low phosphorus	19.25 to 19.75
Old steel axles	20.50 to 21.00
Old iron axles	26.50 to 27.50
Old iron rails	18.50 to 19.00
Old car wheels	14.00 to 15.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire	12.50 to 13.00
No. 2 light iron	8.00 to 8.50
Wrought turnings	9.50 to 10.00
Cast borings	9.50 to 9.75
Machinery cast	15.00 to 15.50
Railroad malleable	14.00 to 14.50
Grate bars	12.00 to 12.50
Stove plate	10.00 to 10.50

E. H. Wilson & Co., iron and steel merchants, have removed their offices from 411 Arcade Building to Room 917, in the same building.

Cleveland

CLEVELAND, OHIO, July 19, 1910.

Iron Ore.—About 60 lake boats have been taken out of commission since the independent vessel owners agreed to tie up 20 per cent. of their vessel capacity 30 days. The carrying capacity of these boats is more than 400,000 tons a trip. The ore movement continues quite heavy, but there are plenty of boats for the cargoes and more vessels will be tied up. The outlook in the lake trade shows no improvement and it is likely that the agreement to keep a portion of the boat capacity out of commission will be continued through August. In a few cases furnace companies that have bought more ore than they now expect they will need this season have asked that a portion of their tonnage be carried over until next year, but such requests are not being granted by the ore firms. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—The market continues very quiet, sales during the week being limited to small lots of 150 tons and under. While a few consumers who have had inquiries out are still holding off, the opinion prevails that the bulk of the foundry trade in this territory is covered for its requirements for the remainder of the year. There is a scattered inquiry from stove and agricultural implement makers for small lots of foundry iron for last half delivery. Two Akron, Ohio, makers of warm air furnaces have inquiries out for 1000 tons of No. 2 foundry, each for the first half of next year. Prices that are being quoted on these inquiries are about 50 cents a ton higher than last half prices. A maker of heating apparatus in Western Pennsylvania is in the market for 1000 tons for the last half. While one Cleveland interest has sold some foundry iron at $14 at furnace for outside shipment, underselling Valley furnaces, recent prices are being pretty well maintained for local delivery, although there have not been inquiries during the past two or three weeks of sufficient size to test the market. Two Valley interests that have recently been low sellers are now understood to be out of the market. There is little demand for Southern iron. A number of buyers in this market are holding off in the hope of getting lower prices than $11.50,

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Birmingham, for No. 2. For prompt shipment and the last half we quote, delivered, Cleveland, as follows:

Bessemer	$16.40
Northern foundry, No. 1	$15.65 to 15.90
Northern foundry, No. 2	15.15 to 15.40
Northern foundry, No. 3	14.65 to 14.90
Gray forge	14.15 to 14.40
Southern foundry, No. 2	15.85
Jackson Co. silvery, 8 per cent. silicon	19.25 to 19.50

Coke.—Foundry grades are slightly firmer. Owing to the fact that their output is pretty well sold up, some producers have advanced prices and others have withdrawn quotations. Foundry coke continues in fair demand, a number of contracts for the last half and an entire year having been placed during the week. Contracts for a full year are being made at last half prices. We quote standard Connellsville furnace coke at $1.60 to $1.70 per net ton, at oven, for spot shipment and $1.80 to $1.85 for the last half. Connellsville 72-hour foundry coke is held at $2.15 to $2.25 for spot shipment and $2.25 to $2.50 for the last half.

Finished Iron and Steel.—The demand in finished lines is only fairly active. The recent easing off in prices on plates and shapes has caused some buyers to hold off, thinking that prices may go lower and that other lines may be affected by the decline. The result of this is a tendency to buy in small lots for only immediate needs. Structural material is now being generally quoted at 1.40c., Pittsburgh, for round lots, the 1.45c. to 1.50c. price being maintained for small lots. Plates are generally quoted on the same basis. The Buffalo & Susquehanna Steamship Company has placed a contract with the American Shipbuilding Company for a lake freight boat for delivery next spring. The contract for the plates and shapes, about 3000 tons, has been placed with the Carnegie Steel Company. The contract for the new building for the Cleveland Athletic Club, requiring 1400 tons of steel, has been taken by the Forest City Steel & Iron Company of Cleveland. The contract for the steel has practically been placed. Steel bar specifications are good, but not much new business is coming out. Concessions have recently been made of $1 a ton in a few cases to the agricultural implement trade. The demand for iron bars continues light. The Union Rolling Mill Company, Cleveland, started up its plant July 18 on special steel bars, and will probably resume rolling iron bars next week. We quote iron bars at 1.40c. to 1.45c., Cleveland. While there is a fair demand for sheets, some of the smaller mills are in need of tonnage, and present price quotations are being shaded $3 a ton on black and $4 on galvanized. The demand for tin plate in this market has become quite active. Warehouse business with jobbers is only fair, orders being less numerous than during June.

Old Material.—The market is still very quiet and dealers do not look for much improvement during the next month. Prices remain weak, several grades being quoted from 25c. to 50c. a ton lower than last week. Mills have good stocks on hand and are not in the market for scrap except in small lots for immediate requirements. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$14.50 to $15.00
Old iron rails	16.50 to 17.00
Steel car axles	20.50 to 21.00
Heavy melting steel	13.00 to 13.50
Old car wheels	14.00 to 14.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.50 to $22.00
Cast borings	6.00 to 6.50
Iron and steel turnings and drillings	6.75 to 7.25
Steel axle turnings	9.00 to 9.50
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	14.00 to 14.50
No. 1 cast	12.25 to 12.75
Stove plate	10.75 to 11.25
Bundled tin scrap	11.00 to 11.50

St. Louis

ST. LOUIS, July 18, 1910.

While it is believed that a large tonnage of pig iron will be wanted to meet the requirements of mills and foundries in the Middle West for the remainder of the year, buyers show no urgency in placing contracts, owing to want of confidence in the market. In some cases foundrymen are short of molders and cannot run full. Reports of cancellations are made, together with a disposition by bankers to husband resources for the movement of the crops, resulting in slower payments by iron consumers. A seasonable demand for coke is reported. The metal market is fairly active and prices are ruling steady. A heavy demand for cement and reinforcement material is a feature reflecting active operations in construction. The outlook for a large fall business in building material is regarded as very promising by the leading distributers.

Coke.—A good business was done in coke the past week, though it is likely that some of it was worked at concessions. On the other hand, one of the leading brokers states that he cannot offer the Connellsville product, as the interests he represents in that field are out of the market, being heavily sold ahead. Virginia producers, however, seem to be anxious for contracts and some low prices were named. Among the sales reported was one of 1000 tons of foundry coke to a local foundry for shipment over a year; 1000 tons of by-product coke and 600 tons of Virginia foundry to an Illinois company, for shipment over a year. There is some irregularity in prices, depending on quantity, length of contract and the field making offers, the range being from $2 to $2.50, with most of the business being done at the inside figure, per net ton, f.o.b. oven.

Pig Iron.—A canvass of the offices brought only moderate indications of interest on the part of buyers in the pig iron market for the week. With some brokers there was little doing, and in case of a merchant seller, the remark was made that cancellations exceeded sales. One of the leading houses reported a sale of 1000 tons of foundry iron for shipment over the remainder of the year, with an inquiry for 800 tons of Southern foundry for the same shipment; miscellaneous country inquiries aggregated 500 tons, and for about the same number of tons from local parties. An inquiry is out from a stove manufacturer for 3000 tons. The sales of another broker aggregated 500 tons, and the following inquiries were received: 200 tons of analysis iron; 200 tons of No. 2 foundry; 1000 tons of malleable Bessemer; 300 tons of No. 2 foundry, all for shipment over the remainder of 1910. Some offices still quote $12, Birmingham, for No. 2 Southern foundry for shipment over the remainder of year; others are offering this iron for the same delivery at $11.50. Southern Ohio is held at $15, f.o.b. furnace. No offerings of 1911 iron are reported.

Old Material.—The demand for scrap iron and steel is very light. Stocks are smaller than at the corresponding time last year, notwithstanding railroad offerings have been larger, owing to the fact that the large dealers have been filling old sales. This has led to more or less business among the dealers and it is still a dealers' market, with no immediate prospect of much demand from consumers whose wants are known to be quite well supplied for the present. There were no railroad lists on the market the past week. Prices are fairly well maintained under existing circumstances, since but a few items in the list are quoted lower than our previous figures. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$15.00 to $15.50
Old steel rails, rerolling	14.50 to 15.00
Old steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard sections, subject to inspection	25.00 to 25.50
Old car wheels	14.50 to 15.00
Heavy melting steel scrap	12.50 to 13.00
Frogs, switches and guards, cut apart	12.50 to 13.00

The following quotations are per net ton:

Iron fish plates	$14.00 to $14.50
Iron car axles	21.00 to 21.50
Steel car axles	20.00 to 20.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	12.50 to 13.00
Railway springs	11.50 to 12.00
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	11.00 to 11.50
Mixed borings	6.00 to 6.50
No. 1 busheling	11.00 to 11.50
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	9.50 to 10.00
Railroad and tank scrap	8.50 to 9.00
Railroad grate bars	9.00 to 9.50
Machine shop turnings	8.50 to 9.00

The American Car & Foundry Company is advertising for bolt makers, axle turners, machinists and other mechanics.

The Big Niangus Hydro-Electric Company of Kansas City, Mo., has been incorporated. Capital stock, $50,000. Incorporators: R. E. Bremer, P. M. Bremer and H. M. Bremer.

The Crescent Forge & Shovel Company, Havana, Ill., certifies to an increase of capital stock from $75,000 to $100,000.

A new trunk line is assured to St. Louis, the Nashville, Chattanooga & St. Louis Railroad having arranged to enter the city over its own rails. It is proposed to construct a bridge across the Ohio River at Paducah, Ky., crossing to Metropolis, Ill. It is estimated that about two years will be required to build the bridge, which has already been passed upon by the Ohio River Commission.

The Commonwealth Steel Company is advertising for men for night shift, roughers, molders and laborers.

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The Hoyt Metal Company reports an excellent demand for finished metals.

St. Louis ranks fifth among 15 cities in fireproof buildings erected in 1909, the value totalling $22,422,929.

San Francisco

SAN FRANCISCO, CAL., July 13, 1910.

A quiet condition still prevails in the Pacific Coast market, though a little more business is being booked than at the beginning of the month, and the dullest period appears to be over. The lack of activity usual in the summer season is intensified by labor disturbances, and while a fully normal movement is expected during the fall no material change is likely during the next six weeks. Some improvement is noted in labor conditions at several points, nearly all the shops being in operation, though work now in progress is retarded, and there is some delay in the letting of new contracts. There has not yet been any tendency among consumers to place orders for distant delivery, and most of the small orders coming in can be readily filled from store. Most merchants are well supplied, and as it is possible to get prompt deliveries in several departments, they do not care to replenish their stocks on a large scale until later in the season. Fabricators in various lines in the interior of the State are comparatively busy, and the principal movement at present is in that direction. The demand for structural material shows some increase. Oil pipe remains dull, though inquiries for small merchant pipe are more numerous. Plates and sheets are moving more freely, and a fair tonnage of plates will be required for marine work. New vessels to be built on the Coast include two submarines for the Navy, at a cost of about $500,000 each, by the Union Iron Works, San Francisco, and a similar vessel to be built by the Moran Company at Seattle, Wash.; a large ferry for the Southern Pacific Railroad, and a 155-ft. steamer to be built by the Moran Company for the Puget Sound Navigation Company, Seattle.

Rails.—The movement is rather light at the moment in both light and standard rails, the principal requirements for this season's work having been purchased earlier in the year. The lightest sections, used for mining purposes, are less active than usual, and jobbers are fairly well supplied. Work is progressing on extensions for a number of small roads in the interior, and further improvements are planned for next summer, but most of the inquiries now in the market are of a rather indefinite nature. Several of the new projects are using very light material, 35 to 45 lb. sections being in most demand for interurban lines.

Bars.—The movement from Eastern mills is of about the same moderate volume as for some time past. Orders for round lots are an exception, most inquiries at present being very small, though the distributive movement is normal for this season. Merchants are booking numerous orders for delivery to interior points, both for reinforcing and manufacturing purposes, but the local demand is very light. The Sacramento Valley Irrigation Company has been in the market for 160 tons of reinforced bars. Bars from store, San Francisco, are quoted at 2.50c. for steel and 2.30c. for iron.

Plates.—The southern California market is still rather quiet, though the outlook there is better, and renewed activity is expected in the near future. In San Francisco and the interior there has been little, if any, curtailment, and the present demand is more than normal. The marine work under contract will cause some increase in the requirements and the outlook for tank and pipe work is very encouraging. Conditions in the oil fields are still uncertain, but if production continues at the present rate storage facilities far beyond those now projected will be necessary.

Structural Material.—June was a very quiet month in San Francisco, the valuation of building permits issued being $2,216,631, considerably below that of June, 1909, and less than for either April or May of this year. The record was also rather small in other coast cities, and conditions remain quiet, though several fabricating contracts of some importance have been placed. The Llewellyn Iron Company has taken the contract for the Los Angeles Athletic Club, requiring over 2000 tons. The Nicolaus, Gaven & Southworth building at Sacramento, Cal., 175 tons, was taken by Milliken Bros., and 300 tons for the Forum Building at the same place will be fabricated by the Palm Iron & Bridge Works, Bethlehem shapes being used. Other jobs on which contracts will probably be let soon are the Auditorium in San Francisco, about 1000 tons, and a new sea wall job requiring about 125 tons. There is talk of several other new buildings, and preliminary figures have been taken on a 10-story building for the Realty Syndicate in Oakland, though the bids were not opened. Plans have been completed for a six-story hotel for the regents of the University of California. A permit has been granted to the Northern Electric and Vallejo Northern companies to construct a large drawbridge over the Sacramento River. The Schrader Iron Works has a small job for the Southside Light & Power Company's plant in San Francisco. Plans have been completed for a Masonic temple at Fresno, Cal., and a large hotel is planned for Klamath Falls, Ore. It is announced that work will be started soon on a $250,000 station for the Southern Pacific Railroad at Sixteenth street, Oakland. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.70c.

Merchant Pipe.—A slight revival is noted both in the jobbing trade and the movement from the mills, though the general condition is still quiet. Buying for new oil well projects has been greatly curtailed, partly on account of heavy withdrawals of land by the Government, and partly by the fact that the output of the Lakeview well alone greatly exceeds the transportation or storage facilities of that district. Some orders are being placed in fields more favorably located, but the over production tends to check new development in all directions. Some local merchants have greatly reduced their stocks, and are now buying in small lots for immediate delivery, but there is still a large tonnage in store. The demand, however, is becoming fairly general, and with the usual revival of business in the early fall supplies should be well cleaned up. Several large lots are being sold for use in water and gas plants in the interior.

Cast Iron Pipe.—Business is comparatively quiet at the moment, though a fair number of small orders have been booked this month, and there is an active inquiry from various parts of the State. There is nothing in immediate prospect calling for any unusual tonnage, but the outlook is favorable for a continued movement of small lots.

Pig Iron.—Foundry work is by no means active, and the prevailing tendency among melters is to keep out of the market as much as possible. Recent orders for future delivery have been few and of comparatively small volume, and the amount of iron in transit is smaller than usual, as importers are not inclined to add to their supplies on hand. The tonnage now held in local warehouses is considered more than ample to meet all probable requirements of the next half year, and most foundries are buying in very small lots for immediate needs. A larger movement is expected as soon as the labor troubles are adjusted, as there is a fair amount of work in prospect. The movement of domestic iron is very small, prices being quoted at $22.50 to $23 for No. 2 Southern foundry. Quotations on foreign foundry iron in small quantities, from store, are as follows: Chinese, $23; Continental, $23; English, $23 to $23.50; Scotch, $24 to $24.50.

Old Material.—The scrap market shows little change, most descriptions being quiet. Cast scrap is firmly held, though considerable heavy machinery scrap is being accumulated in local yards, and the foundries are buying on a rather small scale. Steel melting scrap continues to accumulate, and is rather weak in value, the local demand being small. Rerolling rails and wrought scrap are moving to some extent, though the present tonnage is not especially heavy. Prices are quoted as follows: Cast iron scrap, per gross ton, $17; steel melting scrap, per gross ton, $10; railroad wrought scrap, per net ton, $14; rerolling rails, per net ton, $15.

Birmingham

BIRMINGHAM, ALA., July 18, 1910.

Pig Iron.—Actual sales by all interests in the past week aggregate probably less than 750 tons and the trade manifests such indifference that the coming week's transactions are not expected to indicate any improvement in the demand. Rumors are current that a certain interest would accept a basis of $11, Birmingham, to move a significant proportion of its accumulation, but such reports cannot be verified and it is believed that $11.50, with the possibility of shading 25 cents per ton under especial arrangements, is the bottom price to-day. Those interests that have adjusted their output to order book requirements to such an extent as to take care of the capacity left in operation for some months adhere strictly to a $12 basis either for prompt shipments or deliveries to cover the remainder of this year. The interests that quote a basis of $11.50 do not limit the time of delivery to which that price applies, except, of course, to the last half of this year, and in some cases would probably accept $11.25 for strictly spot shipments. The lack of interest on the part of the trade generally is of necessity a very important consideration in arriving at quotations, and it is no doubt a fact that just at this time even a material reduction in asking prices would not stimulate the demand to an appreciable extent. The course being pursued by the producing interests is apparently a determined one, and it is not unlikely that quotations will remain as they are now, with the production kept at such a low rate that the surplus

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stock will be taken up and present prices made attractive. The total output of foundry iron in this State is now represented by 11 active stacks and, according to authoritative statements, two additional stacks will be added to the idle list during the coming week.

Cast Iron Pipe.—In the absence of evidence to the contrary, prices as last published are quoted, although, with the output unchanged and order-book requirements being gradually reduced, it is probable that slight concessions can now be had. There is as yet no accumulation of stock in this district, and all plants are being operated to capacity, but no large municipal contracts are being advertised and the outlook is not considered encouraging. This can also be said of the cast iron soil pipe industry, in which market a new low level for prices has recently been established. We quote water pipe as follows per net ton f.o.b. cars here: 4 to 6 in., $23; 8 to 12 in., $22; over 12 in., average $21, with $1 per ton extra for gas pipe. These prices can probably be shaded on large municipal contracts.

Old Material.—Hardly sufficient business is being transacted to afford an opportunity of judging the status of prices, but it is not believed that dealers are more anxious to sell than at the time of last report. The aggregate accumulation is comparatively light, but all reports indicate heavy stocks on consumers' yards and more healthy conditions are not expected at an early date. We quote dealers' asking prices (which are nominal in the main) as follows, per gross ton, f.o.b. cars here:

Old iron axles	$16.50 to $17.00
Old iron rails	12.50 to 13.00
Old steel axles	16.00 to 16.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	9.00 to 9.50
No. 1 country wrought	8.50 to 9.00
No. 2 country wrought	8.00 to 8.50
No. 1 machinery	10.00 to 10.50
No. 1 steel	9.00 to 9.50
Tram car wheels	9.50 to 10.00
Standard car wheels	11.00 to 11.50
Light cast and stove plate	7.00 to 7.50

It is announced that the furnace of the Southern Iron & Steel Company at Trussville, Ala., will be blown out the coming week.

Repairs have been made to the plant of the Southern Pipe & Foundry Company at North Birmingham, Ala., which was recently damaged by fire, and operations will soon be resumed.

Cincinnati

CINCINNATI, OHIO, July 20, 1910.—(*By Telegraph.*)

Pig Iron.—The market is dragging. In foundry irons buying is of a hand to mouth character, and only small lots are changing hands. It is reported that the local steel making company referred to last week has bought 6000 tons of basic, to be furnished by an Ohio furnace. Only a fair volume of inquiries is before the trade, a few of which are for delivery the first quarter of next year. The furnace interests seem almost as indifferent about doing business on the present price basis as the buyers are in making contracts. Southern foundry No. 2 is quoted at $11.50, Birmingham, but it is understood this price can be shaded with some furnaces for prompt shipment. Northern irons are not firm and $15, at furnace, can easily be done, although some are holding out for better figures. Malleable can be obtained around $15 to $15.50, with few purchasers. It is rumored that two or three Ohio furnaces will go out of blast within the next 60 days. For immediate delivery and through the last half, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$15.25 to $15.75
Southern coke, No. 2 foundry	14.75 to 15.25
Southern coke, No. 3 foundry	14.25 to 14.50
Southern coke, No. 4 foundry	14.00 to 14.25
Southern coke, No. 1 soft	15.25 to 15.75
Southern coke, No. 2 soft	14.75 to 15.25
Southern gray forge	14.00 to 14.25
Ohio silvery, 8 per cent. silicon	19.20
Lake Superior coke, No. 1	16.70
Lake Superior coke, No. 2	16.20
Lake Superior coke, No. 3	15.70
Standard Southern car wheel	25.25 to 25.75
Lake Superior car wheel	22.25 to 22.75

(*By Mail.*)

Coke.—A number of fair sized future contracts on foundry coke were closed last week, and there was some buying to fill immediate requirements. Several of the Connellsville interests have contracted for their entire output and present quotations on all grades are firm. There is not much doing in furnace coke, but prices are steady and we quote $1.70 to $1.75 per net ton at oven, with the usual 5c. advance for future shipment. Pocahontas furnace grades are quotable at $1.80 to $1.85. Connellsville foundry coke is quoted strong at $2.25, with a slight advance for future shipment, and Pocahontas foundry trails along at the same figure. Wise County coke remains around $2.10 to $2.25, and is a reasonably good seller.

Finished Iron and Steel.—Structural material continues active and a fair amount of reinforcing concrete bar business is reported. Beams and channels are in fair demand and are quoted, out of stock, at 1.90c. to 2c. It is reported that a modification in prices on steel bars has been made in the Pittsburgh district.

Old Material.—Railroad offerings continue light, and a very slim business is reported by practically all the dealers. Prices for delivery in buyers' yards, Cincinnati and southern Ohio, are as follows:

No. 1 railroad wrought, net ton	$11.50 to $12.00
Cast borings, net ton	4.00 to 5.00
Steel turnings, net ton	6.00 to 7.00
No. 1 cast scrap, net ton	11.00 to 12.00
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	16.50 to 17.00
Old iron rails, gross ton	17.00 to 17.50
Old steel rails, short, gross ton	14.50 to 15.50
Old steel rails, long, gross ton	14.50 to 15.50
Relaying rails, 56 lb. and up, gross ton	22.00 to 23.00
Old car wheels, gross ton	12.00 to 13.00
Low phosphorus scrap, gross ton	16.00 to 16.50
Heavy melting steel scrap, gross ton	11.50 to 12.00

The German Iron Market

BERLIN, July 8, 1910.

Reports emphasize the quiet, waiting tendency of the market. Consumers and traders continue to do as little new business as possible. The rate of production of pig iron in June was about 1500 tons per day below the record rate established in May, totaling 1,219,071 metric tons in June, against 1,261,735 tons in May, and 1,067,421 tons in June, 1909. That the furnacemen take a rather cheerful view of the outlook and mean to keep up a big production is evident from the unusually heavy imports of iron ores in June. The arrivals aggregated 1,495,000 tons, being almost twice as heavy as in May.

So far as the price situation is concerned, there have been no reductions here this month, so far as the trade reports indicate, but there is a growing feeling of uncertainty as to their further course. This week this uncertainty has been intensified by a further reduction of bar iron for export in Belgium by 1 to 2 shillings per ton. This news has made an unfavorable impression on the stock exchanges, causing declines in German iron companies' shares.

The chief attention of the trade continues to be given to the movement to reconstruct a pig iron syndicate in the Rheinish-Westphalian district. Further meetings have been held, but the news about the results is rather conflicting. According to one report the movement is at present confined to only six of the big mixed producers, in addition to the Niederrheinische Hutte; but it is asserted that the negotiations between these have so far progressed that a combination between them will certainly be effected, whatever comes of their efforts to give the organization a wider basis. On the other hand, it is denied in some quarters that the Niederrheinische concern has already come to terms with the movers of the new syndicate. There is a side issue to these negotiations; hitherto five concerns in that region were producing ferromanganese, but the Niederrheinische began to turn out this specialty some time ago and speedily beat down the price from about 180 to 150 marks, or even lower. The five works in question, which are apparently in part included among the six companies trying to organize the syndicate, are now attempting to induce the Niederrheinische to abandon the production of ferromanganese in return for a big allotment of pig in the new organization, and it is reported as being willing to accede to their wishes on that basis. This would mean the restoration of ferromanganese prices to a more profitable level for makers, who claim that the costs of producing 80 per cent. are as high as 145 to 150 marks per ton.

The wire rod producers can be well satisfied with their business for the first half of the year. After the shipments for the first quarter had exceeded the allotments of the mills by 5 per cent., the June quarter brought still more active business, shipments being fully 25 per cent. above the allotments. The association controlling this specialty had some months ago reduced the export bounty on wire and wire nails sold abroad, but it has recently restored it to its former figure of 21.50 marks per ton.

The dissolution of the pipe syndicates, mentioned in last week's report, has called forth an unusual volume of inquiries regarding prices. It is believed that these inquiries indicate that there will be active buying as soon as prices seem to be fixed, as it is known that dealers' stocks are low. Prices have probably fallen since the break-up of the organizations, but the reports do not say so.

A report on the hardware trade shows that its condition, while somewhat irregular in its various sections, is rather good. The cutlery trade at Solingen reports a considerable shrinkage of exports to the United States in con-

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sequence of the Payne law, and this business has recently suffered a further backset. Razors in particular have been sent to America in much smaller quantities. The cutlery trade with Canada, on the other hand, has greatly improved in consequence of the settlement of the tariff war between that country and Germany. The Russian business has improved, but trade with India is very slack. Some other sections of the hardware trade are apparently doing considerably better than cutlery. The makers of locks and keys are extremely busy, but chiefly on export orders. Other builders' hardware has suffered severely from the big lockout in the German building trades; but that has now been settled at last, and business in this specialty, as well as in many other lines of goods, like structural forms, should now pick up. Manufacturers of axes, hatchets and hammers are doing a good business, and the outlook for the continuance of their big run of foreign orders is regarded as good. The arms factories have good orders from Argentine for side arms; also smaller orders from Brazil and some other South American countries, as well as some of the Balkan States. Manufacturers of bicycles and automobiles are doing well.

New York

NEW YORK, July 20, 1910.

Pig Iron.—A few sales have been made for deliveries beginning in August and September and running through the year, but the average foundry appears to have provided for its needs in the third quarter. There is a certain amount of small buying to average on the cost of contract iron, but for the most part it is a listless market. Buffalo furnaces have been able to get canal tonnage more freely and thus to reach New York district and Long Island Sound points advantageously, so that relatively more iron will come from that district than has been the case in recent weeks. One New England buyer took 600 tons of Northern iron and about 500 tons of Southern iron, and a New Jersey producer of light gray iron castings is expected to add 2000 tons this week to considerable purchases made in June. A 500-ton inquiry for Lake Superior charcoal iron has come up in New Jersey. Offers recently received from pipe foundries have been declined by several furnaces; they were around $14.75 for gray forge, delivered in eastern Pennsylvania, in one instance. At $13.50 for No. 2 some business has been done in one or two brands of Virginia iron, but other Virginia producers are not meeting this price. We quote Northern foundry iron at tidewater as follows: No. 1, $16.50 to $16.75; No. 2 X, $16.25 to $16.50; No. 2 plain, $15.75 to $16.25. On Southern iron quotations are $16.25 to $16.50 for No. 1 and $15.75 to $16.25 for No. 2.

Finished Iron and Steel.—July is falling short of June in activity in all finished lines. Structural steel mills and fabricating companies have a fair supply of work for the summer, but they are looking a little more sharply for work for the fall months. In the case of the American Bridge Company, operations are now at about 85 per cent. of capacity. As against 48,000 tons in June, it is expected that over 50,000 tons will be turned out in July and that nearly full capacity may be reached by October, with plenty of work in hand to carry through that month. The Brooklyn subway work, taken last year, is only now beginning to come into the shops. The Northern Pacific has recently specified on 3500 tons of its 7000-ton contract of May, but there has been very little new work from the railroads, the Pennsylvania Railroad's orders the past week for several bridges, about 650 tons in all, and that of the Boston & Maine for a 200-ton bridge, being exceptions. The Chicago & Northwestern bought 300 tons of beams, however, which will be rolled at Johnstown, Pa. Levering & Garrigues secured the New York Plate Glass Insurance Company building, Maiden lane and William street, 600 tons, and the Hinkle Iron Works an apartment house on 121st street, near Broadway, 500 tons. The Oliver Chilled Plow Company, South Bend, Ind., placed a 1400-ton building with the Indiana Bridge Company. The building of the Athletic Club of Los Angeles, Cal., 2300 tons, was taken by the Llewellyn Iron Works, a local company. While deliveries of steel bars can be made a little earlier by some mills, the situation continues unsatisfactory for those who are in need of prompt shipments, as only a limited range of sizes can be furnished earlier than 30 days, most manufacturers making no promises on new business within 60 days. The leading bar iron mills are getting a good volume of orders and railroad inquiries are beginning to appear for requirements for the remainder of the year. The local plate business is confined to small lots, on which full prices have been obtained. The boilermakers of this vicinity are having labor troubles, due to the demand of workmen for an advance in wages. Quotations are as follows: Plain structural material and plates, 1.61c. to 1.66c.; steel bars, 1.61c., and bar iron, 1.50c. to 1.55c., all New York.

Cast Iron Pipe.—Inquiries are light and no important business is in sight in this vicinity. Competition is sharp and low prices have been made to some of the contractors who have recently received awards of pipe laying jobs from the city of New York. Carload lots of 6-in. are now quotable at $23.50 to $24 per net ton, tidewater.

Old Material.—Practically no business is being done in heavy melting steel scrap. The price offered by the associated eastern Pennsylvania steel mills is below the views of local dealers who announce their determination to pile their steel scrap rather than accept the price named. Our quotations below on this class of material are based on the eastern Pennsylvania offers, but it would probably be difficult for a buyer to secure any considerable quantity at the rates named. The demand for rolling mill stock is generally light, except for cast borings, wrought turnings and wrought pipe, which are in fair demand for mixture with higher priced material. It is a curious fact that borings sold during the week at a higher price than turnings. This, however, is a circumstance which often happens when prices are as low as at present. During these conditions various materials lose their usual relation with one another. The Isthmian Canal Commission sold 1000 tons of Panama scrap on dock at Hoboken, N. J., on Tuesday. It was secured by a dealer of Harrisburg, Pa., at $10.01 per gross ton. The next bidder was ¾c. per ton under this price, while other bids ranged down to $9.05. A somewhat better demand was experienced for cast scrap, and several sales of good size are reported, one being of 1000 tons. Quotations per gross ton, New York and vicinity, are nominally as follows:

Rerolling rails	$12.50 to $13.00
Old girder and T rails for melting	11.00 to 11.50
Heavy melting steel scrap	11.00 to 11.50
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	17.50 to 18.00
No. 1 railroad wrought	13.25 to 13.75
Wrought iron track scrap	11.50 to 12.00
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	11.00 to 11.50
Light iron	5.00 to 5.50
Cast borings	7.50 to 8.00
Wrought turnings	8.50 to 9.00
Wrought pipe	11.75 to 12.25
Old car wheels	12.50 to 13.00
No. 1 heavy cast, broken up	11.50 to 12.00
Stove plate	9.00 to 9.50
Locomotive grate bars	9.00 to 9.50
Malleable cast	12.00 to 12.50

Buffalo

BUFFALO, N. Y., July 19, 1910.

Pig Iron.—The market is traveling at a little better pace than during the preceding week both as respects inquiry and placement, although symptoms of midsummer quiet are not lacking. Inquiry is principally for foundry grades, and the orders placed are in most instances of only moderate size, averaging about 200 tons, although a few of considerably larger size have been booked, making a fairly good total for the week. Consumers as a rule appear to be covering for a percentage of business somewhat under normal requirements for the remainder of the year, and any improvement in business will make gaps in their stocks which will soon require replenishment. In malleable and basic the week has been productive of only a very small amount of business. Prices for all grades are being maintained at about the same level as during the previous week. We quote as follows per gross ton, f.o.b. Buffalo, for delivery through the last half:

No. 1 X foundry	$15.00 to $15.50
No. 2 X foundry	14.75 to 15.75
No. 2 plain	14.75 to 15.00
No. 3 foundry	14.50 to 14.75
Gray forge	14.25 to 14.50
Malleable	15.00 to 15.75
Basic	15.25 to 15.75
Charcoal	19.00 to 19.50

Finished Iron and Steel.—Some interests report that the reduction in the price of wire products made this week by the largest manufacturers has produced something of an unsettling effect upon conditions in general lines of finished steel products. The leading interest, however, reports no falling off in orders on this account and states that the current miscellaneous demand keeps up well and specifications on contracts are normal for the midsummer season. Canadian export trade from this district continues in good volume for the season, although it is feared that the strike of employees of the Grand Trunk Railway system may interfere somewhat with prompt shipments. In structural material the demand is not quite so good as during June, but specifications for fairly good tonnages are coming in right along. Bids are to go in Friday at Erie, Pa., for steel for the St. Vincent Hospital building, about 400 tons, and on Saturday for the Maine National Bank Building at Erie, about 600 tons. Specifications are out this week for steel for the new Sherman House, Jamestown, N. Y., 900 tons, and specifica-

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tions will be issued shortly by Buffalo architects for the steel for the Utica Hotel, Utica, N. Y., about 1200 tons. The Jones & Laughlin Steel Company received contract for the steel for the machine shop of the Pennsylvania General Electric Company's plant at Erie, Pa., requiring a large tonnage, and L. F. Shoemaker & Co., New York City, received contract for the structural steel work for the Ohio street freight house extension for the New York Central Railroad, Buffalo, about 300 tons. The contract for the reinforced concrete work for the New York Central freight house in question and for a large freight warehouse which the same company is to erect for the use of the Western Transit Company at Ohio street and Buffalo river was let to the Eastern Concrete Steel Company, Buffalo.

Old Material.—The market is quiet and but little business is being done in any line. The mills are still holding back shipments on contracts and dealers are stocking such material as they are obliged to accumulate. Prices have a lower tendency. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$13.25 to $13.50
Low phosphorus steel	17.50 to 18.00
No. 1 railroad wrought	14.25 to 14.75
No. 1 railroad and machinery cast scrap	13.25 to 13.75
Old steel axles	17.50 to 18.00
Old iron axles	22.00 to 22.50
Old car wheels	14.00 to 14.50
Railroad malleable	13.75 to 14.25
Boiler plate	11.25 to 11.50
Locomotive grate bars	11.00 to 11.50
Pipe	11.00 to 11.50
Wrought iron and soft steel turnings	6.50 to 7.00
Clean bast borings	5.50 to 6.00
No. 1 busheling scrap	11.75 to 12.00

Metal Market

NEW YORK, July 20, 1910.

THE WEEK'S PRICES

Cents Per Pound.

	Copper.			Lead.		Spelter.	
July.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
14	12.62½	12.37½	32.67½	4.40	4.25	5.20	5.05
15	12.62½	12.37½	32.67½ / 32.75	4.40	4.25	5.20	5.05
16	12.62½	12.25	32.80	4.40	4.25	5.20	5.05
18	12.62½	12.25	33.00	4.40	4.25	5.20	5.05
19	12.62½	12.25	33.12½	4.40	4.25	5.20	5.05
20	12.62½	12.25	33.25	4.40	4.25	5.20	5.05

There has been a heavy buying movement in pig tin and the available stocks for July delivery have been practically cornered. The copper market has been more active at lower prices. Lead has an upward trend and the spelter market is stagnant.

Copper.—Talk of copper curtailment has been revived, but there is no evidence in the trade of a concerted movement toward reducing the production. There has been some buying at lower prices and on Friday and Saturday good sales of electrolytic were made at 12.25c. Some of the leading sellers continue to ask 12.50c. for electrolytic, but this puts them practically out of the market as there are plenty of offerings at the lower price. Lake copper is bringing 12.62½c. and casting copper, which has become more plentiful, is down to 12.30c. In London to-day spot copper was sold for £53 6s. 3d., and futures for £54 8s. 9d. The sales amounted to 500 tons of spot and 1400 tons of futures. The market was firm.

Pig Tin.—The tin available for July delivery in this country has been practically cornered and the price has been advanced above 33c. It is a significant fact that it is costing more in this market than in the London market, the advanced price here being the equivalent of about £2 more than the price asked in London. It became known last Friday that there would be no important arrivals of tin until August 1, whereupon there was an immediate scramble to buy. The price at that time was 32.67½c. and on Friday and Saturday there was active trading that sent the price up until it had reached 32.80c. when the market closed on Saturday afternoon. This was the first time in a number of weeks that there was any trading on Saturday. There was further buying on Monday and Tuesday, and to-day it became apparent that the supply of spot tin was about cornered. It is estimated that the sales during the week for all accounts amounted to about 700 tons. It will be interesting now to see whether the consumption of tin will justify the judgment of the parties who have taken up the available supply. To-day there were sales of tin, scheduled to arrive by steamer here on August 1, at 32.80c. It is understood that on that day there will arrive a heavy cargo, and if recent purchasers realize on their speculations they will probably have to do so before that time. Spot tin was sold in New York this afternoon for 33.25c. In London to-day spot tin was sold at £148 10s., and futures at £149 12s. 6d. The sales amounted to 250 tons of spot and 270 tons of futures. The market was steady.

Tin Plates.—The strike among the sheet metal workers has lessened the demand for tin plate in the building trades and the general manufacturing industries are not taking a great amount at this time. The price in New York for 100 lb. coke plates is $3.84.

Lead.—Some good sales have been made, and although the American Smelting & Refining Company continues to hold the metal at 4.25c. St. Louis, and 4.40c. New York, outside sellers are getting higher prices. There have been sales at East St. Louis as high as 4.35c., which would make the price 4.50c. in the New York market. These sales have been made to parties who wanted the metal in a hurry. As the American Smelting & Refining Company is able to supply all the lead called for at present with reasonable promptness the price asked by that company rules the market.

Spelter.—The spelter market is very quiet. The demand from the galvanizing trade, which uses about 62 per cent. of the spelter produced in this country, has fallen off noticeably, but this has made no impression on the producers of spelter as regards price. It is said that the production is being quietly reduced and in this event the existing prices, which many consumers think are higher than they should be, may not go lower. Spelter is now selling at 5.05c. St. Louis, and 5.20c. New York.

Antimony.—There are heavy offerings in the market of brands of antimony that are not very well known and the persistent attempts to introduce them at low prices has brought about a reduction in the price of the better known grades. Consumers are holding off. Cookson's can now be had at about 8.25c. and Hallett's is being freely offered at 8c. Chinese and Hungarian antimony are being offered at 7.50c.

Old Metals.—The demand is light. Dealers' selling prices, which are nominally unchanged, are as follows:

	Cents.
Copper, heavy cut and crucible	11.75 to 12.00
Copper, heavy and wire	11.25 to 11.75
Copper, light and bottoms	10.50 to 10.75
Brass, heavy	8.25 to 8.50
Brass, light	6.75 to 7.00
Heavy machine composition	11.00 to 11.25
Clean brass turnings	7.50 to 8.00
Composition turnings	9.25 to 9.50
Lead, heavy	4.05 to 4.20
Lead, tea	3.80 to 3.95
Zinc scrap	4.15 to 4.25

Metals, St. Louis, July 18.—Lead is strong at 4.30c.; spelter is weak at 4.95c. to 5c., East St. Louis. Zinc ore is held at $38 to $40, Joplin base. Tin is quoted at 33.05c. per pound; antimony, 8.55c.; lake copper, 13c.; electrolytic copper, 12.70c., all St. Louis. The demand for finished metals ruled quiet the first of the week, but the last three days brought orders to the leading manufacturer for upward of 500 tons of miscellaneous stock.

Metals, Chicago, July 19.—Owing to the midsummer dullness and the fact that many foundries are closed, the demand is limited to spot or prompt deliveries. Consumers show little inclination to buy for the future. Tin is a little higher. Spelter continues weak with very little demand. We quote Chicago prices as follows: Casting copper, 12⅝c.; lake, 12⅞c. to 13c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33¾c.; small lots, 35c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.15c. to 5.20c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12c.; copper bottoms, 10½c.; copper clips, 12c.; red brass, 11c.; yellow brass, 9¼c.; light brass, 6c.; lead pipe, 4¼c.; zinc, 4⅛c.; pewter, No. 1, 24c.; tin foil, 26c.; block tin pipe, 30c.

Foundries in the Youngstown, Ohio, district have agreed either verbally or by document to pay their coremakers and molders a minimum of $3.30 per day. The William Tod Company has not made any agreement with its men, but will probably run on the open shop plan, paying as high wages as its competitors, but refusing to deal with any labor organizations.

The work of changing the channel of the Calumet River at Gary, Ind., is proceeding rapidly. The new channel is 50 ft. deep and 1½ miles long. It will relieve from overflow a large tract of land heretofore waste and on which the Indiana Steel Company will have 960 coke ovens and additions to its plant.

The World's Production and Consumption of Metals

An abstract of the full statistical tables relating to the production and consumption of lead, copper, spelter, tin, aluminum, nickel and quicksilver, compiled by the Metall Gesellschaft, the Metallurgische Gesellschaft, and the Berg und Metallbank, of Frankfort-on-Main, has been made by the London *Ironmonger*. The world's production for the past four years is given as follows in metric tons:

	1906.	1907.	1908.	1909.
Lead	973,100	986,000	1,061,200	1,081,900
Copper	712,900	703,000	744,600	844,100
Spelter	702,000	738,400	722,100	783,200
Tin	98,800	97,700	107,500	108,300
Aluminum	14,500	19,800	18,600	24,200
Nickel	14,300	14,100	12,800	16,100
Quicksilver	3,700	3,200	3,300	3,200

The percentage of increase and decrease for the four principal metals in the group is shown in the table below:

	1907 over 1906.	1908 over 1907.	1909 over 1908.	Aver. yearly increase in the last 10 years.
Lead	+1.3	+7.6	+2.0	3.0
Copper	—1.4	+5.9	+13.4	6.0
Spelter	+5.2	—2.2	+8.5	4.8
Tin	—1.1	+10.0	+0.7	4.0

The consumption of the above mentioned metals in Europe and the United States was as follows, the figures representing metric tons:

	1906.	1907.	1908.	1909.
Lead—Europe	587,400	603,400	701,100	684,800
United States	351,400	295,300	293,000	365,000
Copper—Europe	404,800	406,800	477,700	451,800
United States	303,600	225,500	208,800	318,900
Spelter—Europe	494,200	503,300	532,000	540,200
United States	200,000	205,000	193,000	260,000
Tin—Europe	57,700	57,300	59,100	58,500
United States	43,700	39,700	32,800	42,800

The statistics of consumption are commented on as follows: "These figures show the remarkable difference between the development of metal consumption in Europe and in the United States, though in estimating tonnage an element of uncertainty is introduced by the fact that the lead and spelter stocks are all in private hands, and that as far as Europe is concerned it has been impossible to take into account any alterations in such stocks, while in the United States the estimates of stocks must not be taken without reserve. The figures above, however, indicate the broad lines of development."

Aquadag Used as a Cutting Compound

Some remarkable results have been obtained by the Niagara Machine Company, 825 Linwood avenue, Niagara Falls, N. Y., from the use of the graphite lubricant, Aquadag, made by the Acheson Oildag Company of that city, as a cutting compound. This lubricant is composed of pure deflocculated graphite and water, the particles of the former being so finely divided that they will remain permanently suspended.

Recently a large number of cold rolled steel rods having an average diameter of about 1 in. were being cut off in a lathe. The average number of cuts that the cutting-off tool would make with one sharpening was 60 when using an ordinary soap cutting compound, but when a small amount of deflocculated graphite was mixed with the cutting compound it was found that the tool did not become dull as rapidly as before and made 980 cuts with only one sharpening. In the second case the tool not only did about 16 times as much work as in the first, but the ends were very much smoother and the work was done much better.

The company has also used Aquadag for many other machine tool operations with the same good results. For instance, in boring and reaming a large number of holes in bronze bushings with an ordinary cutting compound, the hole is always about 0.0002 in. smaller than the reamer used, but by the addition of Aquadag to this compound a hole practically the full size of the reamer can be cut, which shows that in some way graphite increases the cutting possibilities of the tool. It has also been possible to effect a considerable reduction in the horsepower consumed. Certain machines which it was necesary to run with the back gears in when using an ordinary cooling compound, by the above mentioned addition of graphite to the compound, are now run with an open belt. In this case not only a reduction in the horsepower consumed by the cutting tool, but also that an increase of speed is made possible.

The Republic Wage Scale Settled

PITTSBURGH, PA., July 20, 1910.—(*By Telegraph.*)—At a conference held in this city yesterday between committees of the Republic Iron & Steel Company and the Amalgamated Association, a settlement of the Amalgamated wage scale for puddling and finishing mills was reached, which will be effective for one year from July 1.

The puddlers will receive $6.12½ a ton for boiling on a 1.45 cent card for bar iron, which is equal to an advance of 50 cents a ton. For busheling on cinder bottom, when cast borings are used, the advance is 37½ cents a ton over the old scale; 13 cents advance when light scrap is used and 10 cents when heavy scrap is used. For busheling on sand bottom, when heavy scrap is used, the advance is 7½ cents a ton and when light scrap is used 10 cents a ton.

The muck rollers are given an advance of 2½ cents a ton over the old scale. In the bar and 12-in. mill scales the roller is given an advance of 3½ per cent., catchers 3½ per cent., heaters 4 7-10 per cent., and roughers 4 7-10 per cent. In the guide mill scales rollers, heaters and roughers are given an advance of 4 7-10 per cent. over the old scale.

It is probable that the bar iron mills of the Republic Company, which have been closed since June 30 pending settlement of the wage scales, will be started up as soon as they can be made ready.

A conference now is likely to be arranged between the Western Bar Iron Association and the Amalgamated Association, and it is probable that the same settlement will be made.

Iron and Industrial Stocks

NEW YORK, July 20, 1910.

Some market authorities are now beginning to take a slightly more hopeful view of the situation in securities. This is quite a change from recent weeks, during which discouragement and doubt appeared to be universal. It is the critical period for important crops, however, and prices of stocks are expected to be influenced from day to day by developments in that direction. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalm., pref.	30	Railway Spr., com.	31⅜- 31½
Beth. Steel, com.	25	Railway Spr., pref.	98 -100
Can, com.	8¼- 8⅝	Republic, com.	29⅝- 31⅜
Can, pref.	68½- 69¼	Republic, pref.	91 - 91⅝
Car & Fdry, com.	49¼- 50⅝	U. S. Steel, com.	68⅜- 71⅝
Car & Fdry, pref.	112¾	U. S. Steel, pref.	114⅜-116½
Steel Foundries	50 - 52½	Westinghouse Elec.	59 - 60⅝
Colorado Fuel	31⅛- 32¾	Am. Ship, com.	83½- 84
General Electric	141½-144	Am. Ship, pref.	109¾-110
Gr. N. ore cert.	51 - 53¼	Chi. Pneu. Tool	36
Int. Harv., com.	93⅛- 94⅞	Cambria Steel	42⅝- 43⅜
Int. Harv., pref.	119½-120	Lake Sup. Corp.	18¾- 19½
Int. Pump, com.	43⅜- 44½	Pa. Steel, com.	60 - 65
Int. Pump, pref.	81½- 82¾	Pa. Steel, pref.	103 -106¼
Locomotive, com.	38½- 40	Warwick	9¼- 9¾
Nat. En. & St., com.	15½- 16	Crucible St., com.	11⅛- 11½
Pressed St., com.	31 - 32⅝	Crucible St., pref.	77 - 77⅞
Pressed St., pref.	95½- 96	Harb.-W. Ref., com.	31½

Dividends.—The American Rolling Mill Company, Middletown, Ohio, has declared a quarterly dividend of 1½ per cent. on the preferred and 3 per cent. on the common stock.

The Harbison-Walker Refractories Company, Pittsburgh, has declared a dividend of 1½ per cent. on the preferred stock.

The Pittsburgh Malleable Iron Company, Pittsburgh, has declared a quarterly dividend of 2½ per cent. and an extra dividend of 2½ per cent., payable July 29.

The Machinery Markets

The machinery business in the New York territory is unusually good for this time of the year. There are inquiries before the trade which indicate that there will be a general buying movement within a few weeks, and some decidedly good orders were placed during the last week. A large drill manufacturer and a Western iron works were heavy purchasers in the New York market, and the General Electric Company, Schenectady, N. Y., through the Pennsylvania General Electric Company at Erie, has been negotiating some purchases. In other parts of the country the machinery business is on a satisfactory basis. In Cincinnati the machine tool builders are now working on full time and most of them have large orders ahead. In this branch of the machinery industry prices are particularly firm. In Chicago the prospects are bright for heavy buying in the fall and the second-hand machinery trade is active at good prices. In St. Louis there is a good market for heavy equipment and new construction work indicates that there will be increased activity later on. The market is quiet in Milwaukee, except for heavy sales of electrical equipment. In Detroit business is irregular, but plans for shop extensions will develop a good business later on. In the Northwest there has been good buying on account of hydroelectric plants and the demand for water power equipment is equally good. Mining and irrigation projects and proposed power plants have brought out a good business in the Southwest and in the farther West the machinery activity is confined to mining territory. The usual midsummer inactivity is noted in Philadelphia and Pittsburgh.

New York

NEW YORK, July 20, 1910.

The machinery market in New York is very active for this time of the year and in addition to a good general buying movement some large manufacturing projects are developing that will call for heavy expenditures for machinery. Last week the Ingersoll-Rand Company and a large Western iron works made heavy purchases of machine tools equipment and the New York Central Railroad gave some supplementary orders on a large list which is now about closed out. The Pennsylvania General Electric Company has inquiries in the market for some machine tools which may be bought through the General Electric Company at Schenectady, N. Y. From all indications the Delaware, Lackawanna & Western Railroad will shortly place orders against a heavy list it has had before the trade for some weeks for its Scranton shops and the United States Motor Company, 505 Fifth avenue, New York, has inquiries out which indicate that it will be a good customer in the machinery trade very soon.

The Pennsylvania General Electric Company, which operates the plant at Erie, Pa., owned by the General Electric Company of Schenectady, N. Y., has issued a list of machine tools which include one power hack saw, one 60-in. vertical boring mill, one wet tool grinder, one 1½-in. bolt cutter, a good sized engine lathe and other equipment to be installed in a gray iron foundry. It is said in the trade that the company will make further additions to its Erie equipment.

It has been announced that the Delaware, Lackawanna & Western Railroad Company will have its new shops at Scranton, Pa., in operation by January 1 next. There has been a list before the trade in this market calling for a large number of machine tools, and the trade has been waiting a long time to hear of some action on the railroad toward closing out for these requirements. Machinery men who are familiar with the company's affairs declare that the buying will be begun within the next few days.

The Auto Car Company of Ardmore, Pa., is looking for a site in the vicinity of New York for a plant to be used for the manufacture of automobiles. As soon as the necessary property is obtained the company will, no doubt, be in the market for machinery equipment.

The Butterick Pattern Company, New York, will later on require equipment for a plant for the manufacture of tissue paper. It is understood that the company is now looking for a site, as it expects shortly to begin to manufacture its own paper, and it is possible the plant will be located at some point where a hydroelectric power plant can be installed.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York, are preparing plans for two large shops to be erected for the Missouri Pacific Company, for which a large amount of equipment will have to be purchased. The Simms Magneto Company, 1780 Broadway, New York; the Griscom-Spencer Company, 90 West street, New York, and the Gunn Motor Company, Utica, N. Y., are all planning improvements which call for machinery expenditures. It is conservatively estimated in the trade that there is fully $300,000 worth of actual business in sight in this market, and the improvements contemplated by the companies mentioned above will call for expenditures covering a large part of that sum. This should clearly show that the machinery trade is by no means dull in this market, but nevertheless there is much pessimistic talk in the trade which the facts at hand do not seem to warrant. It may be true that in some lines the machinery trade is not particularly good. For instance, the demand for contracting equipment, such as excavating machinery and the like, which was good a few weeks ago, has fallen off largely because of the fact that most of the contractors have summer work well under way. There is also a lessened demand for second-hand machinery, but it should be taken into consideration that up until a month ago the call for some classes of second-hand machinery exceeded the supply and was decidedly more than normal. Within 50 miles of New York there is one manufacturer of mining machinery and shafting whose plant is working with a night shift. There are two machine tool builders in the Manhattan territory part of whose product is ordered up six months ahead, and the New York representative of one of the largest manufacturers of automatic equipment cannot promise any of the products of his plant for delivery under four months. Most of the foundries in this vicinity that make machinery castings have all they can do, and many of them are beginning to increase their manufacturing facilities before fall. This information is the result of a general canvass of the machinery trade covering a varied line of manufacture, and the instances where business was found to be light are entirely counterbalanced by the good demand experienced by the trade in general.

McLaughlin Brothers, Inc., 521 St. James street, Philadelphia, Pa., have designed a machine shop to be erected on Garfield avenue, Jersey City, N. J., for James Craig. The building will be 82 x 210 ft. and it will be of brick, steel and reinforced concrete. The structure will be equipped with electric traveling cranes and a model line of machine tools and other equipment for the construction of engines which are now being built by Mr. Craig at 556 West Thirty-fourth street, New York. McLaughlin Brothers laid out the entire plant and will supervise the installation of the equipment.

The Hazard Motor Mfg. Company, Rochester, N. Y., has been organized with a New York charter authorizing a capital of $400,000 to take over the business of the Hazard Engineering Company. The management of the company will not be changed and it will continue to manufacture gasoline motor power plants and special motor equipment.

The Berlin Construction Company has received a contract for rebuilding the fan shop of the Green Fuel Economizer Company, at Matteawan, N. Y., which was almost totally destroyed by fire some weeks ago. It is expected to have the new building erected and ready for occupancy about the middle of August. The new shop will have about 25 per cent. more floor space than the old shop, including a test room fully equipped with chambers, gauges, &c., suitable for making exhaustive tests on the capacity, pressure and efficiency of the improved fans built by the company. The new building will be of steel construction throughout and will be heated by the hot blast system, with frequent outlets near the floor to secure uniform distribution of the heat. This system has been applied by the Green Fuel Economizer Company with great success in several buildings that were peculiarly difficult to heat.

The Beaver Mfg. Company, Buffalo, manufacturer of wall boards and panels, has commenced the erection of its

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extensive new plant at Ontario street, Military road and the New York Central Railroad, North Buffalo. A large amount of paper mill machinery not yet ordered will be required, comprising digesters, rolls, cutters, trimmers, &c. A separate power house is to be erected for which boilers, a direct connected engine, electric generators and motors will be required. Wm. F. MacGlashan is president and manager, 228 Perry street; F. A. Shoemaker, 21 Builders' Exchange, mechanical engineer.

The Gaffney Wood Products Company recently incorporated at Bradford, Pa., will build a large chemical plant at Walton Station on the Buffalo & Susquehanna Railroad, 10 miles from Galeton, for the manufacture of wood alcohol, acetate of lime, potash, charcoal and other wood products, having acquired a tract of 30,000 acres of timber land in Potter County.

The Linde Air Products Company, Buffalo, Cecil Lightfoot, general manager, manufacturer of ogygen-oxyacetylene, &c., is building a brick and steel addition, 60 x 150 ft., one story, to its plant at Chandler street and Manton place.

The Empire State General Vehicle Company, Rochester, N. Y., has been incorporated with a capital stock of $100,000, by G. A. Hallister, R. M. Searle, and J. T. Hutchings, of Rochester, and will engage in the manufacture of vehicles and appliances. Arrangements are being made for a plant.

The National Lead & Battery Company, Niagara Falls, N. Y., manufacturer of storage batteries, &c., which recently increased its capital stock to $5,000,000, has had plans prepared for and will soon begin the erection of extensive additions to its plant on Elizabeth street, in the Niagara Power Land Company manufacturing district; D. M. Hepburn, manager, Niagara Falls.

The Troy Scale Company has been incorporated at Troy, capital stock $100,000, to manufacture measuring and weighing devices. The incorporators are F. A. W. Kelley and D. Eldon of Watervliet, N. Y., and W. M. Hall of Troy.

The United States Hoffman Company, Syracuse, N. Y., will erect a three-story and basement addition, 50 x 150 ft., to its factory on Temple street for the manufacture of clothes pressing machinery.

The Board of Supervisors of Erie County, F. B. Steele, clerk, room 36, City and County Hall, Buffalo, N. Y., is receiving bids for the construction of a power and lighting plant for the Erie County Penitentiary. The power house will be of stone, brick and steel, 60 x 65 ft., with brick stack.

The Henry Schenck Company, Erie, Pa., has received contract from the Hamet Hospital of Erie for the erection and equipment of a power house and laundry building at Second and State streets.

The Fulton County Gas & Electric Company, J. B. Hodgson, superintendent, Gloversville, N. Y., will build a high tension line from Gloversville to Epwatah, a distance of 9 miles, and will erect and equip a brick substation at Gloversville. One hundred and thirty-five steel transmission towers will be required, 46 to 52 ft., a frame construction.

As a result of the increasing demand for welded flanges, heads and bottoms on steel cylinders, tanks, &c., instead of the riveted work which was formerly considered satisfactory, the facilities of the American Welding Company, Carbondale, Pa., have been taxed to the utmost lately. The equipment in service, however, enables orders to be executed promptly.

Perforated metal for coal, ore and rock handling plants, as well as other industrial operations in great variety, is so largely in demand this year that the works of the Hendrick Mfg. Company, Carbondale, Pa., which are devoted to this product, have been kept crowded with orders. The railroad companies are also good buyers of this material.

Chicago

CHICAGO, ILL., July 19, 1910.

Dullness continues to prevail in the Chicago Machinery market. Many houses are busy taking inventory, and this, together with the vacation let-up is having its effect on the machinery business. Practically all of the buying done is of a pick up nature, and such orders as are placed are for single tools which are required for immediate use. It is the general opinion among dealers, however, that there is a considerable amount of business pending and that the approach of fall will bring out a large volume of orders. There is a fair demand for second-hand equipment considering the season of the year, and such machines usually bring a good price owing to the urgent needs of the buyer. No orders have been placed as yet against the Chicago, Burlington & Quincy list which has been before the trade for some time. On account of the favorable crop reports being received as a result of the recent rains, it is believed that the railroads will soon place the orders for the machine tools and equipment that have so long been pending and which are urgently needed.

The E. B. Hayes Machine Company, Oshkosh, Wis., has under construction a new building 60 x 250 ft., with a wing 30 x 80 ft., which will be used as a blacksmith shop, power house, &c.; also an apartment which will be devoted to a wash room, locker room and other conveniences for its employees. The main building will be served with an electric crane, the runway of which will extend for several yards in front of the building. All departments of the plant are being arranged into adjoining sections to facilitate the handling of raw material.

The Henry B. Lewis Structural Iron Works, Detroit, Mich., will commence work in the near future on a new structural steel shop and office building 115 x 200 ft., to be erected on a site recently purchased. The building will be served with an electric traveling crane, the runway of which will extend into the yard. The shop will contain two galleries in which light pattern work will be carried on. A complete equipment will be installed which will facilitate the handling and fabrication of steel shapes.

The Sharples Separator Company, West Chester, Pa., has purchased a lot at Washington and Jefferson streets, Chicago, which it will improve by the erection of a building at a cost of about $100,000, details of which have not been definitely determined upon. The building when completed will be occupied by the western branch of the company now located in the Plamondon Building, Monroe and Clinton streets.

Chickering Brothers, Chicago, manufacturers of pianos, have purchased the property at South Park avenue and Twenty-third street, 100 x 179 ft., and are having plans prepared for a seven-story factory building. The building will cost about $200,000, and it is understood that construction work will commence at once.

The Algoma Iron Works, Ltd., Sault Ste. Marie, Ont., which has been in operation a great many years, has been incorporated with a capital stock of $500,000. No improvements are contemplated.

The Reliance Engineering & Mfg. Company, 2009 Peoples Gas Light & Coke Company's Building, Chicago, has been incorporated with a capital stock of $100,000 to manufacture a gas governor and appliances which are now being manufactured on the Pacific Coast. It is the intention of the company to promote the sale of these appliances in Chicago territory and vicinity and erect a factory for their manufacture as soon as business conditions will warrant, which will probably be in the course of six or seven months.

Frederic Schafer & Son, South Bend, Ind., have opened a machine shop for doing repair work and manufacturing special tools and machinery.

The Crescent Forge & Shovel Company, Havana, Ill., has increased its capital stock from $75,000 to $100,000, and is contemplating improvements to its plant.

The Rock Island Plow Company has awarded a contract for the construction of a forge shop 150 x 300 ft., foundry addition 66 x 120 ft., pattern and experimental building 50 x 100 ft., warehouse 115 x 235 ft., and a core room building, which are to form the nucleus of a new plant.

Additions to be made to the water works system at Galesburg, Ill., will include two boilers of 350 hp. each, small centrifugal pumps and a crank and fly-wheel pumping engine of 6,000,000 gal. daily capacity.

The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., is about to proceed with plans, mentioned some time ago, for the building of a machine and forge shop to be used in repair work.

Chalmers & Williams, Chicago, have taken one of the largest contracts for mining machinery recently let in the Southwest, comprising the complete equipment of a concentrating plant to be erected on the property of the Frisco Mines & Power Company, operating in Mohave County, Ariz. The order called for prompt delivery and a part of the machinery is already on the way.

An additional air compressor will be purchased for the municipal water works system at Monmouth, Ill.

The large quantity of steel wire rope which is being used this year in all parts of the country has created a very active demand for one of the products of the Chicago Steel Foundry Company, Chicago. This is a crucible cast steel socket with a spiral interior, which gives a gripping power that can be relied upon absolutely, in any situation, for firmly holding the rope.

Bids are about to be taken for a compound or triple expansion engine of 12,000,000 gal. daily capacity to be in-

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stalled by the city of Springfield, Ill., in connection with its water works system.

The Portland Foundry & Machine Company, Portland, Ind., which makes a feature of drop forgings for special service, has had enough business offered from motor vehicle manufacturers alone to keep its works very busy, and there seems to be no immediate probability of any let up in this demand.

The Inter-State Electric Light & Power Company, Galena, Ill., which supplies the mining districts of Southwestern Wisconsin with power for operating machinery at most of the mines, mills and smelters in the territory reached by its transmission lines, has passed under the control of the H. M. Byllesby Company, Chicago, who engineered the development. It is reported that they will add to the capacity of the generating station and extend the service.

An addition 35 x 50 ft. is to be made to the municipal power and pumping station at Batavia, Ill., in order to provide for the installation of new equipment.

The American Seeding Machinery Company, Richmond, Ind., has let contracts for a one-story foundry, 90 x 200 ft. and a four-story storage building 130 x 165 ft. A part of the equipment has been purchased.

Philadelphia

PHILADELPHIA, PA., July 19, 1910.

Characteristic midsummer inactivity is to be noted in nearly all branches of the trade, and the market drifts along with occasional small sales, the larger propositions, as a rule, receiving but little attention. There has been practically no railroad buying, and no fresh demand is reported, although revised bids on some few tools are being made. Merchants report a seasonable business, confined principally to smaller tools, usually in single lots. Manufacturers continue to take a fair run of business in the aggregate, although sales are quite irregular, orders coming from widely scattered points. Considerable figuring of special tools for export is being done, but no large orders have yet been reported by builders in this territory. The trade has a fair volume of business in prospect, not so much for new plants as for proposed improvements and extensions, which will require quite a good volume of equipment, which, however, will not develop to any extent, it is believed, until later in the year.

There has not been a great deal of business transacted in second-hand machinery and tools; in instances dealers have been pretty well cleaned out of desirable equipment in some lines and find it difficult to pick up good modern tools for resale. A fair business in boilers and engines continues to be done.

The vacation period has had the usual influence on business and in many cases transactions about to be closed have been deferred on that account. The general weakness of the iron and steel markets has also had some influence in holding back business, as buyers for the most part are inclined to make purchases along conservative lines until general business again shows a forward movement.

The Wilmington Malleable Iron Company, Wilmington, Del., is building an addition to its power house and will install two generators of about 700 hp. and an extra boiler.

The Edgar Allen American Manganese Steel Company is providing increased molding floor space at its New Castle, Del., plant. With the rearrangement of the plant, purchased from the Tropenas Steel Company, 7200 additional square feet of molding floor space was provided, increasing the former space 100 per cent.

The U. S. Engineer Office, 815 Witherspoon Building, Herbert Deakyne, Major Engineer, will receive bids until August 10 for constructing a steel twin screw suction hopper dredge for Southwest Pass, Mississippi River. Information can be had on application to the above address.

The Brylgon Steel Casting Company, New Castle, Del., is operating its plant at full capacity, and has sufficient orders on its books to keep so occupied for many months. A slight let-up in the demand for new business is reported.

The Jones Cold Storage Door Company, Hagerstown, Md., is having plans prepared, it is reported, by O. G. Simonson, Baltimore, Md., for a two-story manufacturing plant, comprising machine, finishing and assembling rooms, galvanizing department, offices, storeroom and boiler house, to be erected in Hagerstown, Md.

The Reading Iron Company, Reading, Pa., has taken out permits for the erection of a one-story steel and corrugated iron addition to its sheet mill. The building is of irregular shape, 84 x 34 x 8 ft., and will be located at Water and Spruce streets. It will house an additional heating furnace for the skelp or finishing mill.

The Falconer Company, Baltimore, Md., will build a new stationary manufacturing plant at Gay and Water streets, 70 x 125 ft., five stories. Charles L. Reeder, Equitable Building, is the engineer. Work on the building will be started, it is said, at an early date.

The Deemer Steel Casting Company, New Castle, Delaware, will erect an addition, 45 x 125 ft., to be used as a chipping department. The company has been steadily adding to its molding floor space and now is using its present foundry building, 70 x 325 ft., to its full floor space. Its present capacity is about 200 tons a month, which will be increased to 300 tons when a new converter, now building, is installed. Provision has also been made for the installation of additional cold saw cutting off machines, pneumatic chippers and sand blast cleaning apparatus.

Contracts for several improvements to manufacturing plants, referred to recently, have been let and the actual work of erection of the buildings started. Among these is the fireproof building for the Mayer & England Company, makers of electrical supplies, who will concentrate their various plants now located in other sections of the country, in the new building, for which J. N. Gill & Co. have the contract. The contract for the new factory for A. Mecky & Co., at Seventeenth and Allegheny avenue, has been let to H. C. Baton, while Doak & Co., contractors, have commenced work on a large commercial garage for the Auto Car Company at Twenty-third and Market streets.

The Cooper Heater Company, recently incorporated under the Pennsylvania laws, is erecting a plant at Carlisle, Pa., for the manufacture of hot water heating apparatus for trolley car service, as well as for dwellings. John H. Gardner is president, and Walter Stuart, treasurer. This concern has purchased the equipment of a plant at Dayton, Ohio, which is to be moved in its entirety to the new location.

Fire destroyed the main building of the Ehret Magnesia Mfg. Company at Port Kennedy, Pa., on July 16, entailing a very heavy loss. Plans are being made for immediate rebuilding, which will require about five months. Considerable new equipment will be required, but it is not known at present what the requirements will be.

The Autocar Company, Ardmore, Pa., which is building a large commercial car garage at Twenty-third and Market streets, Philadelphia, is now in the market for a 300-light electric light plant for the building, for which they want a 30 or 40 hp. gas engine, direct connected with the generator. At a later date the company will be in the market for machine tool equipment, an air compressor and equipment for a forging and brazing department. Every convenience for handling repairs will be installed, facilities being provided for storage of 200 to 300 cars.

The Tabor Mfg. Company, builder of molding machines, has purchased five acres of ground at Stockley street and the Port Richmond branch of the Philadelphia & Reading Railroad, upon which it will erect manufacturing buildings, and remove on their completion from the present plant at Eighteenth and Hamilton streets. Plans for the new buildings have been completed, and it is expected that work will be started at an early day.

Pittsburgh

PITTSBURGH, PA., July 19, 1910.

Taking everything into consideration, the opening weeks of July have shown an excellent record in the sale of machinery, orders for which have been coming in very regularly from every section of the United States, with considerable foreign trade. There have not been many large contracts let recently, but the buying is of a character that indicates further demand from the same sources. Municipalities are among the best customers of manufacturers in this district, and their requirements cover a wide range, from valves, hydrants, switchboard instruments, &c., up to electric generating units, pumping engines, filtration plants, &c., of large capacity. In the general industrial field inquiries originate chiefly with factories, mills and other establishments outside of the line of the metal working trades, indicating a condition by which the last named will be very favorably affected, as sales to these plants are closed. Purchasing on the part of coal mining companies also continues and coking operations not only call for considerable equipment to be used in connection with new ovens, but also many replacements of apparatus heretofore in service. Automatic devices are particularly wanted wherever they can be made applicable.

The demand for steel, gray and malleable iron castings is well sustained, and most of the foundries have all they can do, with the result that extensive additions and improvements are being planned. In some cases a greater output could be obtained with existing facilities were it not for

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the scarcity of molders and other skilled workers. For the lighter grades of castings molding machines are being used more than ever before, and the situation this season has given a decided impetus to their sale in this district. In some quarters there seems to be a reaction at present, from the tendency of the past few years, on the part of manufacturers, to install or enlarge their own foundries. Jobbing foundries that give prompt, efficient service are benefitting accordingly.

The foundation of the Keystone Tube Company's new building at Connellsville, Pa., has been completed, and work is now commencing on the structural steel frame. With the exception of some details that have not yet been fully decided upon, the machinery and other equipment needed have been purchased.

It is stated locally on what appears to be good authority that the Federal Government will soon advertise for bids covering work for the improvement of the Ohio River which will amount to nearly $4,000,000. This will undoubtedly stimulate the market for contractors' outfits, as those now in service will be practically all required for other large contracts recently placed.

Local machinery houses are advised that the American Zinc, Lead & Smelting Company will make improvements during the course of the present season in its plants at Caney and Dearing, Kan., designed to increase both the output and operating economy. Purchasing of equipment on this account will be done gradually, however, and mainly here or in the East.

The new plant of the Ellwood City Iron Works, Ellwood City, Pa., is starting out with a heavy run of orders.

The Ridgeway Dynamo & Engine Company has been awarded contracts for electric generating plants to be installed in the army posts at Fort Sill, Okla., and Fort Terry, N. Y.

Expenditures to the extent of $8000 will be made at Millersburg, Ohio, for improvements to the pumping plant and water works system, involving the purchase of some new equipment.

The Berwind-White Coal Mining Company, Pittsburgh, has made extensive purchases designed to increase its coal handling facilities, and a considerable percentage of the orders will be executed by the works of this district.

The Warren Foundry Company, recently organized at Warren, Ohio, has made arrangements for operating to its full capacity the local plant which was secured, and will provide increased facilities as the requirements of the business develop.

The Premier Pocahontas Collieries Company, Premier, McDowell County, W. Va., is about to dispose of considerable equipment used in construction and development work. During the next few months its mining operations will be considerably extended.

The Monterey Railway, Light & Power Company, Monterey, Mexico, in which Pittsburgh capital is interested, is placing orders for electrical equipment and other machinery.

A gradual increase has been found necessary by the Pennsylvania Inspection Bureau, Johnstown, Pa., in its facilities for the examination and testing of bridge and structural material of all kinds. Rush orders now appear to predominate, as nearly every concern wants its work done in a hurry.

The department of the business of the Wm. B. Scaife & Sons Company, Pittsburgh, which is devoted to tank work, stack erection, &c., is experiencing no dearth of orders this season, and indications are that the coming autumn will be among the busiest in its history.

The Columbiana Boiler Company, Columbiana, Ohio, besides its line of high pressure boilers, has had a very good trade, thus far during the year, in the galvanizing pots, annealing boxes, &c., which it manufactures. The demand for equipment of this character is steadily growing.

Contracts have been placed by the American Can Company for electric power machinery of greater capacity than that now in service at its plant in New Castle, Pa. Some auxiliary equipment will be purchased later on.

It is understood here that some new machinery will be required in the near future for a four-story building to be added to the plant of the American Fork & Hoe Company, Geneva, Ohio.

It is reported from Washington that numerous inquiries have been made by Pittsburgh manufacturers and export houses in regard to the campaign for the extension of American trade in Europe, as outlined by James E. Dunning, American consul at Havre, France, during his recent visit to this city. One feature of this is covered by exhibits to be made in 1911 at the exposition held in Turin, Italy. The products of this district are now finding a very good sale abroad.

Local authorities, who have been making a vigorous campaign for the elimination of smoke, state that during the past month about 75 large manufacturing plants either installed or contracted for smoke consuming devices.

It is reported from Erie, Pa., that pumping engines of large capacity are to be purchased there within the next few months, in order to provide for the enlargement of the municipal water system. An expenditure of $150,000 for the necessary machinery is now proposed.

New pumping machinery will be installed this fall in the city pumping plant at Sistersville, W. Va.

The Mead-Morrison Company, whose representatives for this district have headquarters in the McChesney building, Pittsburgh, is finding this a very good year for the sale of machinery for coal handling plants, excavating and general contractors' service, such as is comprised in its regular lines. A good deal of especially designed equipment has also been called for within the past few months.

One of the large manufacturers here is figuring on two steam turbine units of 2500 kw. each, which are to be purchased by the city of Buffalo, N. Y., to furnish electric current for motors driving centrifugal pumps. Bids have not yet been formally invited, but will be taken in the near future.

The Dunn Mfg. Company, Pittsburgh, is putting on the market in considerable quantity a special extension trench brace, which is made with ball and socket joints that enable it to be used in any position.

The Finkel-Hackmeister Company, Pittsburgh, will erect a new three-story factory building and warehouse on a site recently acquired for the purpose. Building operations are not likely, however, to be undertaken before spring.

Visits to the plants of the Westinghouse Electric & Mfg. Company, Westinghouse Machine Company, Carnegie Steel Company, Macbeth-Evans Glass Company and other large manufacturing concerns will be made this summer, on a regular schedule, by engineering students of the University of Pittsburgh.

Electric generating units for city lighting service will be installed at the municipal power and pumping station in Youngstown, Ohio. The proposed equipment has not yet been purchased.

The Greenville Metal Products Company, Greenville, Pa., was chartered at Harrisburg with $250,000 capital. The incorporators include S. H. Penfield, B. S. Dean, F. P. Hall, C. M. Jones, F. Goodwell, Jamestown, N. Y.; E. S. Templeton and W. P. Nathews, Greenville, and R. R. Rogers, Corry, Pa.

Cleveland

CLEVELAND, OHIO, July 19, 1910.

The outlook with the local machinery houses is a little more encouraging. Some new prospective business has come out during the past few days, so that dealers are counting on more activity during the dull part of summer than they expected earlier in the month. Few orders were placed during the week in the local market and new inquiries were quite few in number, but those that did come out were for fairly good sized lots of tools. The demand for single tools is less active than during June. The Gaeth Automobile Company of this city came out during the week with an inquiry for machine tool and power equipment for a new plant, and another inquiry for machine tools, cranes and foundry equipment, aggregating about $30,000, is being figured on by Cleveland dealers. Several other lists that have been out for a few weeks have not yet resulted in orders, but there are no reports that the buying in any of these cases has been postponed for more than a limited time. Considerable work in the way of factory extension is either in progress or in prospect in this territory, but in most cases plants that are being enlarged are of a character that do not require much machinery equipment. At present new industrial enterprises that are being formed to engage in metal working lines are not very numerous and dealers are feeling the lack of orders from this source. During the past year a large number of new companies have launched into the manufacture of various automobile accessories, but this field seems to be pretty well filled up for the present. The demand for second-hand machinery is holding up well.

Little complaint is heard about conditions among local manufacturing plants. While some report a falling off in orders this month, this was to be expected during inventory time, and most plants are still comfortably filled with work. In the foundry trade there is a good demand for light gray castings and most of the local foundries are well supplied with orders.

The Gaeth Automobile Company, Cleveland, which will build a new plant, has issued a list of its machinery and power requirements, as follows: One No. 4 Cincinnati vertical milling machine; one No. 5 Potter & Johnson automatic chucking and turning machine; three 16-in. Reed lathes; one Warner & Swasey No. 2 hollow hexagon turret lathe; one 3½ x 6 in. low swing lathe; one No. 3 Brown & Sharpe universal grinder; one Drew radial drill press, with 4-ft.

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arm; one Grant-Less gear hobber; one Gleason bevel gear tester; one 18-in. Gleason generator; one No. 6 Pratt & Whitney miller; one 24-in. Fellows gear shaper; one Long Arm system chamfering machine; one cutter grinder for Fellows gear shaper; three Barnes sensitive drills; two Barnes drills, one 26-in. and one 20-in.; one Baker Bros. high speed drill, with compound table; one 11-in. Blount speed lathe; one No. 3½ Greenard bench arbor press; one No. 0 Springfield straightening press; one 12-in. stroke slotting machine; one 14-in. swing Fox lathe; 100 bench vises, 5-in. jaws; 250-lb. trip hammer; three open forges, No. 00S, Buffalo Forge Company; one straightening plate, 3 x 5 ft.; one No. 4 Blount combination grinder stand; one No. 2 Bridgeport combination water tool grinder; American Gas Furnace Company's brazing table; one No. 15 Lea simplex circular saw; one No. 3 La Point broaching machine; one No. 21 Gisholt lathe; two No. 1 Barnes horizontal boring machines; two 80-hp. engines; one generator; three 25-hp. motors; bake oven for paint shop, 10 x 16 ft.; air compressor, with capacity of 50 cu. ft. per minute; shafting, pulleys, hangers, &c. In addition considerable equipment will be required for the tin shop, including the following: One No. 3 planishing hammer; one 42-in. slip roll pipe former; one crimper and header combined; one grooving machine; one Hubbert double seamer, with reversible horn; one large turning machine; one sheet folder; shears, punches and other small equipment. While it has been announced that the new plant will be built in the vicinity of East Pittsburgh, officers of the company state that the site has not yet been definitely decided upon. The company's present Cleveland plant will be dismantled as soon as the new plant is built.

B. A. Worthington, receiver of the Wheeling & Lake Erie Railroad, announces that it will be 30 days before the lists of the railroad's requirements for the completion of its equipment of its locomotive shops at Brewster, Ohio, are sent out. The list as originally prepared has been cut down somewhat. The new list contains about 15 large tools. Their purchase will involve an estimated expenditure of $57,000.

The Cleveland Hardware Company will shortly install considerable new equipment and has an inquiry out for the following tools: Two 16-in. shapers; ten 24-in. shapers; one 18-in. lathe; one 48-in. planer; one 5-ft. radial drill; one 48-in. boring mill; one steam hammer.

The Seneca Chain Company, Kent, Ohio, has increased its capital stock from $300,000 to $600,000.

The American Steel & Wire Company has placed an order with the Case Crane Company for two 40-ft. electric cranes for the Central blast furnaces in Cleveland.

The Cleveland Wire Spring Company will enlarge its plant by the erection of a two-story building, 80 x 100 ft. The company finds the capacity of its present plant too small to accommodate its growing business.

The Diebolt Motor Car Company, Canton, Ohio, has been incorporated with a capital stock of $20,000. This is an old concern, but it is announced that the capacity of its plant will be increased. The incorporators are Robert J. Diebold, W. R. Meyers, D. T. Quinn, Ludwig Wolff and C. T. Heingartner.

The Board of Commissioners of Clay County, meeting at Brazil, Ind., will receive bids August 8, for plumbing, heating and electric plant for the county infirmary. J. L. Burns is auditor.

The Princeton Light and Power Company, Princeton, Ind., has increased its capital stock from $75,000 to $100,000. H. C. Barr is president.

The Cleveland Crane & Engineering Company is building an addition to its plant at Wickliffe, Ohio, and has installed considerable new machinery.

Cincinnati

CINCINNATI, OHIO, July 19, 1910.

July may not show as many orders booked as some of the previous months, but the situation, so far as the machine tool builders are concerned, is generally satisfactory. Practically all of them are working on full time, and quite a number have orders enough in hand to make them feel somewhat indifferent about taking on new business, especially that calling for prompt shipment. It is candidly admitted that had the railroads come into the market for their requirements, as was expected, the manufacturers would have been very seriously embarrassed in taking care of them and their other customers. Machine tool dealers are doing a fair business and have a satisfactory volume of inquiries in hand.

From present indications, buyers of machine tools who anticipate lower prices will doubtless be disappointed. There seems to be an under current of feeling among tool builders individually to the effect that prices will have to be stiffened. Labor is at the top notch and with operating and other expenses increasing, the tool builder will naturally consider seriously advancing figures to a more reasonable basis.

An erroneous impression as to the automobile industry appears to have been entertained by some of the trade. The weeding out of a few insufficiently capitalized automobile firms in different parts of the country gave ground for the report that the business had reached its topmost level; while as a matter of fact, the leading manufacturers are going ahead with proposed improvements and extensions, knowing that if the demand for pleasure vehicles should slacken, they could readily turn to building commercial trucks, which field, comparatively speaking, has been barely touched.

The American Tool Works Company is one of the local tool builders having such a number of orders in hand for its lathes, planers, shapers, &c., that it has been found necessary to increase its capacity by putting on every available man. While no building additions are planned, the company is using every inch of its present floor space, and indications point to a continued period of activity at its large plant on Culvert street.

The United States Paper Goods Company, Cincinnati, has purchased a site at Elsmore avenue and Reading road on which it intends erecting a large manufacturing plant. Building details are being worked out by L. P. Hazen & Co., this city.

The R. K. LeBlond Machine Tool Company has commenced work on additions to its factory which will give it 75,000 sq. ft. more floor space. Two of the buildings will be 45 x 250 ft., one story, and one 60 x 225 ft., four stories, all of brick, steel and concrete construction. The company is very busy on orders previously booked and is very optimistic as to the future.

The factory of the Cincinnati Punch & Shear Company is running full time, and it has orders enough in hand to keep it thus employed for some time. The company reports its export business as showing steady improvement.

It is understood that the business, good-will and patents of the Ritter Folding Door Company, Cincinnati, have been purchased by the Kinnear Mfg. Company of Columbus, Ohio, manufacturer of the Kinnear rolling steel shutter, and that the Ritter plant and office will probably be moved to Columbus.

With the idea in view of increasing its capacity, the American Oak Leather Company, Cincinnati, has awarded contract to the Kaps-Brehm Company, contractor, this city, for a boiler house addition 56 x 68 ft. of reinforced concrete construction.

The Chesapeake & Ohio Railroad Company has commenced work on the foundations of a roundhouse, blacksmith shop and coaling station at Silver Grove, Ky. Some machine tools will be needed for the shop. It also intends constructing a roundhouse and coaling station at Russell, Ky.

The Schneider & Goosmann Machine Company, Cincinnati, has moved from 20 East Ninth street to 1929 Race street, where it is fitting up a shop 35 x 50 ft. for the manufacture of small planers. It is the company's intention to make some additions to its new plant at an early date, for which some equipment will be required. It was recently incorporated with $15,000 capital stock, and the following are its officers: Fred. Schneider, president; Anthony Schemel, vice-president, and Fred Goosmann, secretary and treasurer.

The new building at the intersection of the Big Four Railroad and Carthage pike, now occupied by the Ritter Folding Door Company, has been sold by its owner, W. M. Greene, to the Steel Fireproof Construction Company, Covington, Ky., of which company Max Goldsmith is president. It is the reported intention of the company to move its Covington plant to the new location as soon as the Ritter Company can vacate the premises.

Tentative plans are under way for an addition to the brass foundry of the Ohio Pattern Works, Cincinnati. The proposed new building will be 83 x 100 ft., one story, and of concrete construction.

The August Ferger Company, Cincinnati, will erect a grain elevator, to cost $9000, at Hopkins street and President place.

The Sterling Metal Mfg. Company, with temporary quarters at 77 Elm street, Cincinnati, is a new incorporation with $50,000 capital stock. It is the purpose of the company to make metal filing cases and office appliances, but its manufacturing plans are not yet completed. The incorporators are Christian Keck, Alex. Dom, Harry H. Hyams, Alfred Cohen and Alfred Mack.

The E. H. Huenefield Company, Cincinnati, manufacturer and dealer in tin plate roofing, metals, &c., has purchased the business and machinery of the Cincinnati Tin & Japan Company. The machinery will be moved at once to the new plant of the Huenefield Company at Spring Grove

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avenue and Marshall street. The Huenefield Company was recently chartered with $1,000,000 capital stock. Its officers are: E. H. Huenefield, president; W. H. Huenefield, vice-president, and C. F. Pfau, secretary.

The Jenney Electric Mfg. Company, Indianapolis, Ind., is dismantling its plant in that city and removing the machinery to Anderson, Ind., where it is being installed in the new plant recently completed by the company at that place. The new plant is of sufficient capacity to engage about 1000 employees, and it is expected that enough equipment will be installed to have the plant in operation with several hundred employees within the next few weeks. The company is enjoying a very prosperous year and has orders enough on its books to insure its operation for many months.

The LeMarr Aero Company, Frankfort, Ind., has been incorporated with $50,000 capital stock to manufacture aeroplanes. W. B. Adams is president; Perry Gable, secretary, and Fay Cress, treasurer. The company will manufacture the LeMarr biplane.

The Overland Automobile Company, Indianapolis, Ind., will build an addition to its plant to cost $15,000.

The Premier Motor Mfg. Company, maker of automobiles, Indianapolis, Ind., has bought additional ground near its plant as a site for extensions. A large machine shop, with saw tooth roof, will be the main addition, and there will be a motor test shop 50 x 130 ft. A third new building will be a storage stockroom 50 x 100 ft. The machine shop and erecting room will be 90 x 490 ft.

The Miami Valley Machine Tool Company, Dayton, Ohio, has completed an addition to its plant which will considerably increase its output of machine tools.

New England

BOSTON, MASS., July 19, 1910.

Business in the machine tool trade has let down to a material degree. Buyers are showing no great interest; salesmen are having a hard time finding the men who have authority to decide on purchases of new equipment. The hot weather has driven many manufacturers to an early vacation, and small expectation is expressed that any marked revival will be felt before September. However, the intervening weeks will not be wholly lean, for some good business is in the air. The builders of grinding machines, milling machines and automatics continue to be deluged with orders. Other standard lines are only fairly busy.

The experience of a large dealer in machine tools and supplies, as taken from his books, affords an illuminating comment upon the business situation, especially in its application to the metal industries. The house has customers numbering into the thousands and comprising a vast diversity of product, including all of the multitudinous lines of this territory. The books reveal that the nine months ending July 1 gave a volume of business in supplies equaling 110 per cent. of the figure for the corresponding period of 1906-07, the previous high record, and 90 per cent. of the figure for machine tools. Several factors must be reckoned into the comparison. The normal growth of a prosperous concern must be considered. The fact that delivered goods averaged up to those of a period three years ago does not mean equally prosperous conditions, for were times as favorable the present volume of orders should be considerably greater. On the other hand, the previous period was abnormal, in that the market was at a maximum bordering on the feverish. It is also to be considered that buying during the last year has been for immediate needs as a general thing. The factories are not well stocked up with supplies. Had there been a firm confidence in conditions business would undoubtedly have exceeded all previous experiences. The supply trade holds well for July, indicating that manufacturers in general are busy.

Industrial stocks throughout New England are gradually going up. Dividends, too, are strengthening, several cases of increased rates being announced.

The Universal Boring Machine Company, Hudson, Mass., is preparing plans for an addition which will increase its manufacturing capacity 50 per cent. The company is bringing out a No. 3 Universal horizontal boring machine, containing several important improvements upon the previous design. The machine has a 3-in. boring bar, the length of bed is 80 in., the greatest distance of the face plate to the outboard support is 60 in., the automatic longitudinal feed is 53 in., and the automatic vertical feed is 23 in.

The Lapointe Machine Company, Hudson, Mass., manufacturer of broaching machines and other machine tools, has plans for a large addition to its shops.

The factory and business of the Bay State Screw Company, Hatfield, Mass., have been purchased by a new corporation known as the Hampshire Mfg. Company, with general offices at 1779 Broadway, New York. A. W. Houghton and C. S. Shattuck will retire from the business. The manufacture of spark plugs will be continued at Hatfield by the new owners.

The Malleable Iron Fittings Company, Branford, Conn., manufacturer of steam and gas fittings, malleable iron, steel and semi-steel castings, &c., has completed an addition to its steel foundry building with equipment which doubles the capacity, and are about completing an extension of the malleable foundry, 200 x 215 ft., which will soon be in use. The company is adding to its power a supplementary 625 k.v.a. General Electric turbo generator with Le Blanc condenser.

The Chandler Company, Springfield, Mass., is putting on the market a new line of etched name plates for machinery, which are so finished as to stand frequent polishing and cleaning without sacrifice to legibility.

The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., has brought out a type of automatic screw slotting machine containing various new features, special attention being given to procuring a maximum of time for sawing and reducing to a minimum the time required for handling the work.

The Crandon Mfg. Company, Bellows Falls, Vt., has been incorporated under Vermont laws to take over the business of the National Temperature Gauge Company, Inc., of that place, manufacturer of the National heat regulator, which will be known hereafter as the Crandon heat regulator. J. B. Crandon is the president, A. P. Williams vice-president, and R. C. Bidwell treasurer. The capital stock is $25,000. The company does not expect to purchase additional machinery at present. A large part of the work is assembling and bench operations for which a few jigs and hand tools will be required. The apparatus consists of aluminum plate, bronze gear wheel and arms, Franklin metal cranks and brass dash pots, with small double magnet and a dry battery.

Detroit

DETROIT, MICH., July 19, 1910.

So many manufacturers and dealers are now on vacation trips to the lakes and woods that it is difficult to gauge the present situation accurately. Business appears to be a little better than normal for this season of the year, but the demand in all lines is irregular and likely to continue so for the next four or five weeks. Plans for new factory buildings, foundries or forge shops are, however, announced almost daily; and, wherever one goes, there is almost invariably some mention of improvements to be made in existing plants or additions being outlined. In the metal working industries everyone seems to be very busy. More orders could be taken than are now in course of execution, but the quantity of work in hand is generally satisfactory and not a few establishments have contracts made for as far ahead as they care to book them. Machine tools are moving rather slowly and second-hand stock is less eagerly sought than formerly, with consequent widening of the difference in prices, but both of these remarks are only generally applicable. Some machines are wanted and cannot be obtained except on the basis of considerably deferred delivery, unless rebuilt tools are taken.

The demand from the automobile industries is turning more to power house machinery, motors, pumps, tanks, sprinkler systems, elevators and other equipment of general utility. Purchases from tool lists recently formulated have, in most instances, been at least tentatively agreed upon. Local dealers are getting a very good share of this business, and their counsel has been found of great value by the numerous concerns now entering upon the manufacture of motor vehicles or auto parts which have not heretofore had experience in those lines. In this respect a situation has developed here which is conducive to the best character of trade. Leading dealers not only gained the confidence of their customers, but they have done much to earn it.

Contracts are now being let and equipment will be provided for the new factory building of the Bradley Miller Company, Bay City, Mich. The plans call for a structure 100 x 168 ft., two stories. Electric power will be used.

John Scott & Co., whose office is in the Ford Building, Detroit, are preparing plans for a fabricating plant, 115 x 200 ft., which will be erected here by H. B. Lewis. Further details, including the extent of the equipment needed, have not been announced.

It is reported from Clyde, Ohio, that the plant of the Elmore Mfg. Company, automobile builders, will be extended and improved. No purchases of machinery appear to have been made as yet.

A one-story foundry, 75 x 100 ft. is to be built in September or later by the Kokomo Brass Works, Kokomo, Ind.

The Anderson Forge & Machine Company, Detroit, Mich.,

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is about to install a 250 kw. and a 125 kw. 60 cycle, three phase, 240 volt, alternating current generators in the new plant which it is building. They will be furnished by Allis-Chalmers Company, whose office here is in the Union Trust Building.

The John F. Byers Machine Company, Ravenna, Ohio, whose hoisting engines are constructed with steel frames and steel drums, have sold largely this season to contractors and others engaged in heavy construction work who have need of equipment that will stand long, severe service.

The purchase of a motor-driven centrifugal pump to handle the flow from an artesian well has been authorized by the city council of New Castle, Ind.

The Briscoe Mfg. Company, Detroit, has completed its new auto parts factory and most of the machinery is installed.

Contracts for the new plant of the Alden-Sampson Company at Pontiac, Mich., which will be 150 x 800 ft., one story, have been awarded to local contractors, and the equipment details are now being worked out, some purchases of machinery having already been made.

Plans are in preparation for the factory which the Champion Mfg. Company is to build at Pontiac, Mich. It will be devoted to a varied line of products, including small gasoline engines for motor boats.

The Walker Motor Company, Detroit, has been organized with a capital of $150,000. Its plans have not, however, been announced.

A new brass and aluminum foundry is now under way for the Buick Motor Company, Flint, Mich. It will be completed this summer.

The Saginaw Auto Company, Saginaw, Mich., has provided machine shop facilities for repairing motor cars. Some difficulty is encountered in obtaining skilled men for the work, but not so much as in other smaller manufacturing centers, as good mechanics have been attracted to Saginaw by the large factories now in operation there.

The McCord Mfg. Company, Walkerville, Ont., is turning out radiators for the automobile trade, and has found it necessary to enlarge its working force in order to keep pace with the requirements of the business.

The Jackson Cushion Spring Company, Jackson, Mich., now has its new plant practically completed and in service, the machinery being electrically operated. Contracts already in hand are sufficient to keep it running for some time to come.

The Western Foundry Company, Ltd., Wingham, Ont., is advertising in Detroit for molders, indicating that the situation on the other side of the boundary is practically the same as here.

John Dell, Ozark, Mich., will install a shingle mill at St. Ignace, Mich.

Steel foundry barrels, which are a specialty of the Ohio Mfg. Company, Painesville, O., have been called for to such an extent within the past few months that it will be necessary to arrange for a larger output in the near future.

The Alpena Motor Company, Alpena, Mich., has been incorporated for $450,000.

From Toledo, Ohio, it is reported that the General Electric Company will make extensive additions to its manufacturing plant there, in which the bulbs for incandescent lamps are produced. Plans include the immediate erection of a large new building.

Tools for sheet metal work are so largely in demand this year that the plant of the Consolidated Press & Tool Company, Hastings, Mich., in which a specialty of this class of machinery is made, has been very busy all through the season.

The Dayton Motor Car Company, Dayton, Ohio, has inquiries out here for men with which to operate the new screw machines recently installed, but there is a decided dearth of such labor all through this section, despite the large number that have been brought in from all parts of the country by the various automobile makers under promises of steady employment at good wages.

The Charles Amos Company, Detroit, is estimating on a good deal of structural steel work, which appears to be in greater demand here at present than in any previous period, owing to the activity in factory construction.

The Detroit Foundry Company, Detroit, which operates its machinery with direct current motors supplied from its own power plant, will probably require some additional electrical equipment later in the year, as enough business is offering to justify considerably extended facilities for the manufacture of castings.

The Sherwood Brass Works, Detroit, is working to its full capacity and more skilled men than are at present obtainable could be employed to advantage.

A three-story addition, 80 x 100 ft., will be made to the factory of the Bay View Furniture Company, Holland, Mich. No announcement has been made as to the details of the equipment required, but this has been largely provided for. Building contracts are now being let.

The Garford Company, Elyria, Ohio, is adding to its force and arranging for an increase of facilities to meet the demands of the automobile trade, a large percentage of its business being derived from the motor car plants in this city.

The new plant of the Reddinger Carving Works, Evansville, Ind., is being completed and furnished with a line of modern machinery electrically operated.

The Ireland & Matthews Mfg. Company, Detroit, which is equipped for spinning and drawing work, stamping, &c., has been filling a good many contracts this season for the account of the automobile factories, which demand a very high grade of product. Orders from the general industrial field have also been numerous.

A machine shop for motor vehicle repair work will be established in Zealand, Mich., under the management of J. J. Rookus.

Hayes & Housden, Detroit, are making a specialty of repairing electrical work and also undertake complete installations.

The Standard Die Cutting Company, Detroit, has been incorporated for $25,000 by Charles F. Springman and E. L. J. Mamer of this city. No further details have been made public.

The Otis Steel Company, which is represented in Detroit by Geo. W. House, Ford Building, has found this a very favorable district for the sale of the steel castings and forgings, including axles, which form a part of its product.

Interests said to be identified with the Union Mfg. & Lumber Company, Northville, Mich., have organized the Sanitary Churn Mfg. Company and will provide for the production of a patented machine.

The Detroit office of the Bethlehem Steel Company has placed with local automobile plants and machine shops, in general, that are engaged in the production of motor car parts, a large quantity of tool steel for high speed cutting and finishing. The bars are offered in certain special brands that show some very interesting results in hardening qualities, durability, &c., as demonstrated by actual shop practice.

The Northway Motor & Mfg. Company, Detroit, has increased its capital stock from $250,000 to $1,000,000 in order to provide for the plant extensions and improvements recently determined upon.

It is announced from Pontiac, Mich., that the Vulcan Gear Works, Detroit, will build a factory there.

Business interests of Bangor, Mich., are endeavoring to secure the location there of a manufacturing plant. A water power is available.

The Bower Roller Bearing Company, Dayton, Ohio, has been reincorporated under the laws of Michigan and will remove its plant to Detroit, where it will more than double its present capacity. Details regarding size of buildings to be erected have not been worked out, but the company advises it will probably erect a four-story building of concrete construction, for which considerable new equipment, consisting of automatic screw machines and grinders will be purchased.

The Smith-Matthews Foundry Company, Detroit, has just completed a new plant and will do a general jobbing business, making a specialty of small gray iron castings.

St. Louis

ST. LOUIS, July 18, 1910.

In the aggregate a satisfactory business is passing, as reported by both the merchant sellers of metal working machinery and by the local manufacturers of heavy equipment, light tools, pulleys, &c. Very good evidence of present activity and of preparation for the demands of the future is reflected in the weekly news of additions to plants and the installation of new equipment, both in St. Louis and in the Middle West.

The immense establishment of the Anheuser Busch Brewing Association is constantly being enlarged, either in buildings or equipment. It has now in service some 80 heavy electric trucks, for which a new garage and repair shop is being erected, which will cover, approximately, one-fourth of a city block. It has placed orders for an equipment of high grade machine tools, all of which will be direct driven by individual motors. The company is also building a large sight-seeing truck for transporting visitors over the plant.

The Missouri, Kansas & Texas Railroad system has been placing orders for considerable equipment for the Dennison and Sedalia shops, mostly of woodworking, though a part of the orders are for iron working tools.

The Illinois Steel Warehouse Company is erecting a large steel frame warehouse at Twenty-first and Gratiot streets, which will be equipped with three electrical traveling cranes. It is the purpose of the company to carry a heavy assortment of beams, &c., and thus be enabled to make prompt deliveries in this market.

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The Moon Motor Car Company and the Dorris Motor Car Company, manufacturers of automobiles, are full of work and have recently added considerable machine tool equipment.

The American Can Company has just entered upon the occupancy of a large addition to its factory, which was equipped with machinery manufactured in the machinery department of their plant.

The American Car Company, builder of street and interurban electric cars, is very busy at the present time on orders for equipment from various sections of the country.

The Brecht Butchers' Supply Company has placed orders for upward of $10,000 worth of assorted machine tool equipment, distributed among the dealers here.

The Wabash Railroad has inquiries out for several plate machines and a number of miscellaneous tools.

Second-hand machine tools are arriving in somewhat better quantities and the leading dealers have a very fair assortment of the same for inspection. The firm of Albert Bowman is just getting in a carload of second-hand tools and reports business moving satisfactorily for this season of the year.

The B. Reily Hank Supply Company, St. Louis, has been incorporated; capital stock, $10,000; incorporators: B. Reily Hank, Herman Ernest, Vincent McShane; to engage in manufacturing and dealing in machinery and supplies.

The St. Louis Truck & Specialty Company, St. Louis, has been incorporated; capital stock, $2000; incorporators: John F. Judd, Wm. Waltering and Wm. Berninger; to engage in the manufacture of trucks, tools and miter boxes.

The Harrisonville Pump & Foundry Company, St. Louis, Mo., the incorporation of which was recently mentioned, advises that its capital stock is $45,000 instead of $5000, as previously reported. The company has not decided upon its plans for the future as yet.

The Turley Gear & Machine Company, St. Louis, has been incorporated; capital stock, $25,000; incorporators: H. G. Turley, Anthony Rieth and W. A. Turley.

The Wilson Burner Company, Quincy, Ill., has been incorporated; capital stock $2500; incorporators: J. E. Stanley, Chas. C. Wilson, P. C. Elsey; to engage in manufacturing and dealing in oil burners, fixtures and appliances.

The Bignall & Keeler Mfg. Company, Edwardsville, Ill., is very busy on orders for its line of pipe threading machines.

Business among the shops in Memphis, Tenn., seems to be holding up well for this season. The Allen Engineering Company is just getting its new plant started, which is equipped with electric cranes and a line of high grade machine tools, together with a foundry outfit.

The William J. Oliver Mfg. Company, Knoxville, Tenn., is making extensive improvements to its plant, which will cost about $200,000. L. Le Van, for many years general superintendent of the Oliver Chilled Plow Works, South Bend, Ind., has become vice-president of the Oliver Company and will have entire charge of the manufacturing department. The proposed improvements include the installation of a malleable iron foundry and a general enlargement of the company's plow manufacturing facilities.

Milwaukee

MILWAUKEE, WIS., July 18, 1910.

Sales of power and electrical equipment, as well as machinery of general utility, continue heavy, the demand being pretty well distributed among the leading industries of the country. Otherwise the market is rather quiet.

During the past week the attention of manufacturers and dealers through this section, particularly the former, was largely occupied with the usual semiannual inventory taking, which began July 1 and is now far enough along in most cases to enable the figures to be available for consideration. Where these have come under the writer's personal observation, the percentage of new tools shown is surprisingly large, even allowing for the liberal purchases known to have been made during the last eight or nine months, and reports from various sources indicate that the condition is one which prevails quite generally in the leading industrial centers of Wisconsin. Apparently there has been a great deal of quiet buying with which the State has not been fully credited.

The situation mentioned in last week's report to *The Iron Age* from Chicago—namely, that machinery houses began the second half of the year with more unfilled orders on their books than they have had at any time since the fall of 1907, and that complaints are beginning to appear because the factories in some lines are so far behind—might also be stated with reference to this market. The open weather everywhere has given building contractors an opportunity to do exceptionally rapid work; consequently new plants have been finished ahead of schedule, and manufacturers who have been depending upon the usual delays, such as ordinarily prevent the customer from wanting his machinery at the time he said he would, find that the latter is crowding for delivery before the date specified. The condition thus far has not developed any serious aspects, but it threatens to do so. To the credit of dealers it may be said that, so far as machine tools, motors, &c., are concerned, they have shown much tact and ability in keeping the trade satisfied. There has seldom been a season when the three cornered relations between manufacturers, dealers and users were more harmonious.

The Wisconsin Bridge & Iron Company has the contract for the steel work on the new buildings to be added to the plant of the J. J. Vollrath Mfg. Company, Sheboygan, the character and dimensions of which have been previously reported in *The Iron Age*.

The agricultural implement trade has been a very prominent feature this season of the business of the Lakeside Malleable Castings Company, Racine, Wis., and sufficient orders are obtainable from this source alone to keep the foundry in steady operation. The company has, however, its regular customers in other lines, including the railroads, whose requirements are also being taken care of.

The Bucyrus Company, South Milwaukee, Wis., will begin in the near future the construction of the iron foundry recently mentioned, which is to be of large capacity. As soon as it is completed the present gray iron department will be remodeled for use as an extension of the steel foundry.

The T. L. Smith Company, whose main offices are now in the Majestic Building, Milwaukee, has quite a number of Symons crushers of the improved type in operation and is able to point to some excellent records of service. The demand for concrete mixers and other apparatus of its manufacture continues large, and the capacity of the company's present plant has been severely taxed. Prompt deliveries are, however, being effected.

The plant of the Buswell Lumber & Mfg. Company, Wausau, Wis., which burned recently will be rebuilt.

Among local sales recently made by the Milwaukee Boiler Company are included a 150 hp. boiler for the John Schroeder Lumber Company and one of 100 hp. for the R. Gumz Company.

The Northern Specialties Company, Phillips, Wis., whose incorporation was reported in *The Iron Age* last week, has been organized by John R. Davis, P. J. Demares and J. L. Davis, who are also identified with the John R. Davis Company of that place. The equipment will consist principally of woodworking machinery which is already available for the purpose.

The Modern Steel Structural Company, Waukesha, Wis., will supply the steel roof trusses and other material to be used in the construction of a large new warehouse for the Dells Paper & Pulp Company, Eau Cleare, Wis.

The Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., which now has a large steam plant, equipped with engines, high pressure and low pressure turbines, will undertake an extensive hydroelectric development on the Wolf River, said to involve an expenditure of nearly $1,000,000. A site for the dam and generating station has been secured. There will be available a head of about 60 ft., which can be raised considerably, thus giving ample power for operating the interurban railway systems of the Fox and Wolf River valleys for years to come. It will be some time before the purchase of turbines, generators, &c., is considered.

Jacobsen & De Guerre, engineers of Appleton and Grand Rapids, Wis., are supervising the remodeling of the boiler house and mill at Ladysmith recently taken over by the Menasha Paper Company. Whether or not new equipment is needed has not been stated.

The Belle City Steel Casting Company, Racine, Wis., has increased its capital stock to $10,000 in order to provide for the growth in the business.

Plans for the new plant of the Appleton Chair Company, Appleton, Wis., include four two-story buildings, 58 x 90, 58 x 112, 32 x 54 and 32 x 32 ft., and several smaller structures; also a separate power house equipped with boilers, engines, &c.

The Geuder, Paeschke & Frey Company, Milwaukee, is doing a large amount of custom work this season in metal drawing, stamping, spinning, &c., in addition to its other regular lines, with which the trade is well acquainted. The extended plant, now covering 12 acres, gives it facilities of considerably greater magnitude than it has had in any previous year. In this line of business there is an excellent outlook for fall and winter trade.

Equipment required for the new three-story factory of the Schwahn-Seyberth Company, Eau Claire, Wis., which is 50 x 105 ft., will include a steam generating plant, shafting, belting and electric motors. A freight elevator will also be needed.

The Allis-Chalmers Company announces the sale of a

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steam turbine for a particularly interesting installation to be made by the Standard American Dredging Company, San Francisco, Cal. This unit, which comprises a standard turbine and alternating current generator of 500 kw., will be placed in the engine room of a large dredge and provide power for the operation of a motor driven suction pump used in dredging operations. The exciter will be direct connected to an engine furnished by the American Blower Company, Detroit, Mich. Steam is to be supplied to the turbine at 175 lb. pressure and 100 degrees superheat.

The contract for conveying machinery to be used in connection with the addition to the Brokaw plant of the Wausau Paper Mills Company, Wausau, Wis., has been let to H. W. Caldwell & Sons Company, Chicago, Ill.

The Advance Mfg. Company, Racine, Wis., is making a feature of producing patented articles or other specialties for the account of those who do not possess adequate manufacturing facilities of their own or wish to bring out a new line for which they lack the necessary equipment.

In addition to the boilers and pumps recently mentioned, the city of Wausau, Wis., will require for its pumping plant addition a 6 x 125 ft. stock of brick or steel.

The Malwaukee Bridge Company has the structural contract for a new steel frame building to be erected by the Badger Foundry Company, Racine, Wis. It will be 60 x 60 ft. Construction work is expected to be completed and equipment installed by Sept. 1.

The Beloit Electric Light, Water & Power Company has been requested by the local authorities, with the approval of the Wisconsin Railroad Commission, to extend its service, and this will probably lead to the purchase of some additional power and pumping machinery.

Although it is prepared to undertake bridge and structural work of every kind, in any locality, the Worden-Allen Company, Milwaukee, appears to have had as much as it could do for the past few months, outside of its regular trade, in providing material and erection gangs for the numerous machine shops, foundries and forge shops for which it has taken contracts in this immediate vicinity. The amount of local business offered is probably the largest in the history of this market.

The Hirschberg-Williams-Washburn Company, Milwaukee, is preparing plans for a three-story addition, 50 x 150 ft., to be made to the new factory of the Bradley Knitting Company, Delavan, Wis.

Hoffman & Baur, Milwaukee, have the contract for the sheet metal work on the new buildings of the National Brake & Electric Company, Milwaukee.

The plant of the Brooks & Ross Company, Schofield, Wis., which was destroyed by fire, will probably be rebuilt.

The gas and pumping engine departments of Allis-Chalmers Company, which have kept very closely in touch with foreign practice, will be represented at the joint meeting of the Institution of Mechanical Engineers and the American Society of Mechanical Engineers, in Birmingham, England, by E. T. Adams, who went abroad some months ago. Mr. Adams is an engineer of broad experience and has designed some of the largest and most successful power and pumping plants in this country. At present he is manager of both of the departments mentioned.

A three-story addition, 70 x 150 ft., will be built to the factory of the Rhinelander Refrigerator Company, Rhinelander, Wis. Whatever new machinery is needed has been practically provided for.

The Tomahawk Power Company, Tomahawk, Wis., is arranging for the construction of a dam, preliminary to the proposed hydroelectric power development.

A one-story addition, 20 x 80 ft., will be made to the plant of the Sears-Hitchcock Company, Berlin, Wis.

The Kenosha Electric Railway Company, Kenosha, Wis., is considering plans for the erection of a new steam turbine power station, as the site of its present plant is needed for factory purposes.

The Reliance Engineering & Equipment Company, Milwaukee, would like to have for the standard file set in its main offices, 1417-19 Majestic Building, catalogues of power, electrical and contractors' machinery.

Bids are now being taken on an additional factory building, 75 x 86 ft., four stories, and a power plant, 43 x 54 ft., for the C. B. Henschel Mfg. Company, Milwaukee. An electric generating unit will be installed and motors used for driving the machinery. The installation of a sprinkler system is also contemplated.

The Milwaukee Brass Mfg. Company, which does casting, finishing, polishing and plating work in considerable variety, has had its plant crowded with orders for some time past, and some extension of facilities will probably be provided for within the next few months.

Two electric generators of 750 kw. each and a large line of alternating current motors, probably 45 or more, will be required for the power department of the Wausau Sulphate Fibre Company, Wausau, Wis. Bids are to be taken about Aug. 1.

One feature of the business of the Geo. H. Smith Steel Casting Company, Milwaukee, in which it has built up a large trade, is the production of castings for electric motor yokes and frames, some of the largest manufacturers of electrical machinery being among its customers.

Work is commencing on the construction of an addition to the power plant of the Delavan Heat, Light & Power Company, Delavan, Wis. The equipment now consists of Russell engines driving two direct current Westinghouse generators of 225 kw. What it is proposed to add to this has not been announced.

A great deal of interest has been awakened in this section, as well as elsewhere through the country, in the new line of lathes built by the Milwaukee Machine Tool Company, which was described in *The Iron Age* some months ago. When the new plant of the company in West Allis is placed in service, the production of these machines will be a prominent feature in the tool trade of the State.

The Chain Belt Company, Milwaukee, has thus far had a very favorable season in the sale of its mixers, which are now being utilized on large construction work in various parts of the country. Considering the short time these machines have been on the market, their widespread adoption is noteworthy.

The Southwest

KANSAS CITY, MO., July 18, 1910.

The greatest activity of any in this territory, as recently emphasized, now prevails in the mining and smelting districts of the farther Southwest, where plans for extensive developments, including irrigation, power and oilfield projects, are gradually being worked out. From Texas and Oklahoma inquiries continue fairly numerous, although sales are somewhat slow; and saw mills, stave factories, &c. in Arkansas have recently been buying to some extent. Trade through Kansas and Missouri is dull. Local industries, however, are busy on orders and manufacturing is considerably more diversified than it was only a year or two ago. In some quarters it is stated that quite a number of plants are now manufacturing for stock, but inquiry fails to substantiate that fact to any marked extent, as most of the products of this section are moving out freely on sales previously made. Eastern houses have, however, been more liberal lately with their representatives in the matter of consigned stock, and local branches are more generally providing warehouse facilities than in former years, together with better facilities for repair work.

The Capital Iron & Wire Works, Kansas City, is representing the Milwaukee Concrete Mixer & Machinery Company in the sale of the latter's products, which, although placed on the market only a few months ago, have met with considerable favor in this section.

An electric generating unit will probably be installed during the coming fall in connection with the municipal pumping plant at Nacogdoches, Texas. Plans to that end are now being considered. An entirely new plant may be constructed.

Two all-steel cars have been placed in service by the Little Rock Railway & Electric Company and more are likely to be ordered. The experiment is being observed with much interest by other traction companies of the Southwest.

Pumping machinery of greater capacity than that now in use is expected to be purchased this year at Kinsley, Kan.

The Ash Grove Lime & Portland Cement Company is increasing the capacity of its power house at Chanute, Kan. This was originally equipped with four simple engines with 22-in. cylinders and 43-in. stroke. It has now ordered a 46 x 42 in. low pressure machine, which will be combined with one of the older units to form a cross compound engine. Power is transmitted to the machinery in the works by means of rope drive.

The Kansas City Bridge Company, Kansas City, has secured the contract to construct a number of bridges in the vicinity of Oklahoma City, Okla.

Four new tubular boilers of 300 hp. each will be installed in the Quindaro pumping station at Kansas City to supply steam for the pumping engines that have been ordered, which are for 20,000,000-gal. daily capacity. Contracts covering the entire equipment have been placed.

The combined drilling and milling machine which the W. B. Knight Machinery Company, St. Louis, Mo., is putting on the market, has been showing excellent results wherever introduced for toolroom service and experimental work. It is of light but substantial construction and takes up very little room.

Electrically operated pumps of large capacity are about to be installed in the shafts of the Haynes Copper Company, Jerome, Ariz.

The Southwestern-Port Huron Company, Wichita, Kan.,

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which handles the products of the Port Huron, Mich., Engine & Thresher Company through a large section of the Southwest, has found the present season a very favorable one for the sale of heavy steam rollers of the company's standard line.

A new pumping plant with improved equipment is to be built by the Texarkana Water Company, Texarkana, Texas.

The C. A. Burton Machinery Company, Kansas City, which handles the steam hoists and haulage engines built by the Stroudsburg Engine Works, has had liberal inquiries from contractors and other users, with a fair percentage of sales during the buying season. The market for apparatus of this character is gradually widening.

The complete contract for an electric power and pumping station, water works system, &c., at Ola, Ark., has been awarded the Kress Construction Company, Stuttgart, Ark.

The Desert Power & Water Company, Kingman, Ariz., is having completed in the shops of the Nordberg Mfg. Company, Milwaukee, a cross compound engine of 1500 hp., which will be direct coupled to an alternating current generator of 1000 kw. Auxiliary machinery will also be provided.

The Bennett Stephenson Mining & Milling Company of Las Cruces and Organ, N. M., is about to undertake extensive development work and will soon erect an ore reduction mill of 200 tons daily capacity. Power and operating machinery will be needed.

An elevated steel tank of 90,000 gal. capacity will be erected in connection with a water works system planned for municipal service at Center, Texas. Construction contracts have been let.

J. P. Hanson, who was formerly connected with the Nordberg Mfg. Company, Milwaukee, Wis., will manage the new plant which is being established at Globe, Ariz., by the Globe Foundry & Machine Company. There is an excellent opening in that district for business from the mines and smelters.

The Greenfield Light & Power Company, Greenfield, Mo., has ordered for its plant a belted alternating current generator of 100 kw., three phase, 60 cycles, 2300 volts, which was purchased from the Kansas City representatives of Allis-Chalmers Company, Milwaukee, Wis.

The Theodore Hiertz Metal Company, St. Louis, Mo., which makes a feature of babbitt metal for power machinery, has had a good run of business during the first half of the year, and prospects for the immediate future are quite satisfactory.

Plans are now in preparation for a pumping plant to form part of the proposed municipal water works system at Windsor, Mo.

A large electric hoist is being installed on the property of the Old Dominion Copper Mining & Smelting Company, Globe, Ariz., and other improvements will be effected during the season.

The Southwestern Portland Cement Company, El Paso, Texas, has ordered from Northern builders a motor-driven centrifugal pumping unit, the installation of which will be of interest on account of the operating conditions. Power will be transmitted to the induction motor used, and the motor controlled, from a generating station about 1½ miles distant. The current issues from the dynamos at 480 volts and will be stepped up to 2200 volts for transmission to the motor, which is wound for about that pressure. The pump will deliver 2000 gal. of water per min., against a total head of 80 ft., to a reservoir that supplies the company's works.

It is reported from San Antonio, Texas, that the Commercial Motor Company, headed by Z. Z. Brandon of Toledo, Ohio, will build a plant there for the manufacture of autotrucks, a site having recently been secured.

The city authorities of Seymour, Texas, have contracted with E. J. Dalton, Dallas, Texas, for the construction of an addition to its water works, to cost about $25,000.

The municipal authorities of Altus, Okla., have appointed the J. W. Maxcy Company, Scanlan Building, Houston, Texas, supervising engineer on improvements to its water works, sewer system and electric lighting plant, to cost about $200,000.

The South

NASHVILLE, TENN., June 18, 1910.

The market for machinery continues quiet, business being mostly of a mail-order character. In the line of shop equipment contracts recently placed have been almost entirely for tools to be used in repair work, automobile garages being among the buyers. Sheet metal plants, which have been very busy for months past, are doing some purchasing, but foundries and machine shops generally find their requirements light at present. All, however, appear to have considerable work in hand, and there is no dullness visible in any quarter. Consequently the outlook for a renewed buying movement a few weeks hence is encouraging. The large mills and factories contribute about their usual quota of business, while the mine operators, saw mill owners and companies engaged in various branches of woodworking are also sending in a fairly steady stream of small orders. It is a dealers' and jobbers' market, and, except for the representatives of Northern plants, manufacturers are not making much of an effort just now to place apparatus or supplies directly with the users.

The T. Murphy Iron Works, Jacksonville, Fla., has established an excellent trade in hoists and haulage engines, the demand for which has been more active this year than in any previous season.

The Richmond Forgings Corporation, Richmond, Va., has kept its Belle Island works busy to a considerable extent lately on orders for drop forgings to be used in automobile construction, including nickel, chrome nickel and other special steels. Much more of this business could be obtained, if desired, as there is an abundance of it offering.

Contracts are now being made for the equipment of the new electric generating station to be erected by the Richmond & Henrico Railway, Richmond, Va., in Fulton, Va.

The Roanoke Bridge Company, Roanoke, Va., has been awarded the contract for 13 steel highway bridges to be built in that vicinity.

The Florida Power Company, Ocala, Fla., will install three 300-kw. oil-filled, self-cooled, 60-cycle, 66,000-2300-volt power transformers, to be used in an extension of the company's service. An order for the equipment has been placed with the district manager of Allis-Chalmers Company, Fourth National Bank Building, Atlanta, Ga.

A new steam boiler has been installed and other improvements made in the mechanical equipment of Z. T. Thompson & Son's plant at Grange, Miss.

The General Chemical Company, Pulaski, Va., has purchased two direct current motors for extending electric drive in its plant.

The American Iron & Steel Mfg. Company, Lebanon, Pa., whose Southern business is very closely looked after by representatives having headquarters in the Fourth National Bank Building, Atlanta, Ga., has had a large trade during the first half of the year in bolts, nuts, rivets, &c., for machinery building, plate and structural work. This is particularly interesting as a barometer of prevailing industrial conditions, being one of the most accurate of any that could be referred to.

A new steam boiler has been installed by the Louisville Point Lumber Company, Louisville, Ky.

Plans for an electric power and pumping station are nearing completion at Easley, S. C. Bids covering machinery and other equipment will be called for in the near future.

The large new works of B. F. Avery & Sons, Inc., Louisville, Ky., have been placed in operation.

Preliminary plans are being made for a pumping plant and water works system at Comer, Ga.

Boswell Brothers, Pinola, Miss., are in the market for a second-hand, 13-in. wood planer.

A factory is being erected in Chase City, Va., by the newly organized Jeffreys-Spaulding Mfg. Company.

Pumping machinery for city water service is expected to be installed this year at Clearwater, Fla.

An elevated steel tank will be purchased shortly by the city of Loreauville, La.

The capacity of the municipal power station at Cairo, Ga., now equipped with a Crocker-Wheeler generator of 60 kw., driven by a Harrisburg engine, will probably be enlarged, another boiler also being added to the one originally built for this station by the J. S. Schofield's Sons Company, Macon, Ga. Bonds to the amount of $15,000 have been voted for the improvements.

The C. W. Hunt Company, whose trade in coal and ore handling equipment, hoisting machinery, conveyors, &c., has been largely extended all through the South, has established district headquarters in the Rhodes Building, Atlanta, Ga. An office was also recently opened at Richmond, Va.

The Petroleum Iron Works Company, Sharon, Pa., whose Southern offices are in the Brown Marx Building, Birmingham, Ala., have found this a season of unusual activity in blast furnace construction and repairs, of which they are making a specialty. In Louisiana, Texas and Oklahoma much business is also being derived from the oil refineries. The company has a branch at Tulsa, Okla., to aid in looking after this trade.

Machinery for a pumping plant may be required this fall at Kirkwood, Ga., where plans to that end are now being worked out.

A mechanical filtration plant of 10,000,000 gal. daily capacity will be built for the city of Atlanta, Ga., by the New York Continental Jewell Filtration Company, New York City, which has to its credit the largest number of installations of this character in the South.

Shook & Fletcher, Birmingham, Ala., through whom a

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good deal of the pig iron from that district is marketed, have been selling quite largely to machinery building plants, and, while trade at present is rather quiet, there are evidences that considerably more buying will be done in the near future.

A large woodworking plant, electrically operated, is to be built in Mobile, Ala., by the Vredenbaugh Saw Mill Company.

The business interests of Louisville, Ky., are organized in a strong effort to bring more manufacturing plants to that city. A Bureau of Industries has been formed by the Commercial Club. Correspondence is invited.

Electric power and pumping machinery will be purchased shortly for installation at Sylvania, Ga. Bids on the construction of a new municipal plant, water works and sewage system will be taken until Aug. 1.

The Birmingham Valve & Fittings Company, Birmingham, Ala., is being organized to take over the business of the Stockham Pipe & Fittings Company, manufacturer of steam fittings, soil pipe and fittings. The company has acquired a 10-acre site and will erect four or five buildings of reinforced concrete and steel. Machinery for manufacturing iron and brass specialties will be installed, and the entire plant, it is expected, will cost about $300,000.

The Excelsior Foundry & Machine Shops, Columbia, Miss., of which W. B. Greand is manager, is erecting a foundry and machine shop, to cost about $15,000.

San Francisco

SAN FRANCISCO, July 13, 1910.

The Pacific Coast labor situation is unchanged. The employers at Los Angeles are taking a very firm stand for the open shop, and the strike there promises to be of long duration. The demand for machinery in general is well sustained, and as buyers are having some difficulty in getting prompt deliveries at other coast points there is somewhat more inquiry at San Francisco for articles of local manufacture.

The outlook is favorable for an increasing demand for some lines of equipment manufactured in this territory. Several operators are accordingly developing plans for future improvements, and a few installations are being made, though no general movement in this direction is to be expected until the labor question is settled. Owing to the powerful position and overbearing attitude of union labor in San Francisco, there is some tendency toward the establishment of manufacturing industries at nearby towns rather than in the city itself.

June has been a very quiet month in the machine tool department. So far no business has resulted from the larger inquiries from the Government and the Southern Pacific, and no very important orders have been placed by local metal working establishments, though one or two good inquiries are in prospect. The smaller railroads of the State are keeping out of the market for shop equipment almost entirely.

A few fairly large orders for woodworking machinery have been taken by local merchants recently, but the demand for new machinery is not as active as the number of new mills would indicate, owing to the amount of second-hand equipment on the market. Logging machinery is in fair demand. A contract has been closed for logging 16,000,000 ft. of timber from the Santa Fe right of way, for which some new equipment will probably be required.

Dealers in harvesting machinery report an exceptionally active season. One of the most active departments has been road building machinery. The amount of road work in progress or projected by counties and municipalities of California is greater than ever before, resulting in a heavy demand for scrapers, graders, steam rollers, &c., and there has also been a general inquiry for street flushing machines and oil and water sprinkling devices. Gravel and ore cars are also in fair demand.

The market for pumping machinery remains very active, both for oil and water works. A large volume of business in centrifugal pumps for irrigation is coming from southern California, with numerous orders from the central valley and neighboring States.

Marine work consists principally of repairs, though many small gasoline engines of local make are being used, and the United Engineering Works is installing machinery in a new steam schooner. The largest repair job undertaken here for some time has just been awarded to the Moore & Scott Iron Works, who will repair the army transport Thomas at a price of $428,889, the work to be completed in 199 working days. Figures have also been taken on repairs to the steamer Yucatan, which was submerged for several months in Alaskan waters.

The Pacific Coast Steel Company, which built a shop at South San Francisco last year, has let contracts for another building, and is buying a number of machines for general sheet metal work. A large steam engine formerly used by the Union Iron Works has been purchased.

The plant of the Byron Jackson Iron Works is working at full capacity on turbines and pumping machinery, most of which consists of small units for irrigation purposes. The largest work now on hand is a 500-hp steam turbine direct connected with a centrifugal pump, for an irrigation project in the Hawaiian Islands.

The Samson Iron Works, Stockton, Cal., is withdrawing its San Francisco office, which has been maintained for some time at First and Market streets, and will conduct all business at the Stockton office.

The Western Pipe & Steel Company has concluded the purchase of a 12-acre tract at Richmond, Cal., and will proceed at once with the erection of an up-to-date plant for the manufacture of all descriptions of riveted pipe, well casing and tanks up to 65,000-barrel capacity. No detailed list of machinery required is given out, but the equipment will cost between $75,000 and $100,000. The company has on hand a large amount of tank work for the oil fields, where it has a plant in operation, in addition to large shops in San Francisco and Los Angeles.

It is announced that the shops and main offices of the Hoover Auxiliary Spring Company will be moved from Fresno, Cal., to San Francisco.

Figures have been received for a 15-ton traveling crane with three motors for the United States Navy Yard at Mare Island, Cal.

About 100 cars of the Hicks Locomotive Works, which have been in use by the Ocean Shore Railway, have been sold to E. F. Clark and R. C. Gillis of Los Angeles.

The brick making equipment of the Popular Brick Company, San Francisco, including a 300-hp. Corliss engine, boilers, presses, &c., was sold at auction July 1.

It is reported that the Sierra & San Francisco Power Company will next year add about 15,000-hp. capacity to its steam generating plant.

The Empire Mine, near Grass Valley, Cal., is planning to install two large Oliver filters and a cyanide plant.

The Henderson Mechanical Motor Starter Company has been incorporated in San Francisco, with a capital stock of $20,000, by J. C. Henderson, A. Miller and J. J. Doyle.

The Los Angeles Steel & Malleable Iron Company, Los Angeles, has taken options on a 20-acre tract at Long Beach, and plans to erect a plant for the manufacture of a patent rail locking device. It is announced that work will be started next fall on the reinforced concrete shop building.

The Pacific Electric Railway Company, Los Angeles, is planning to install a large shop for the purpose of building its own cars.

The Rose Quartz Mining Company, Gibsonville, Cal., is planning to erect a stamp mill.

The Oil Well Equipment Company has been incorporated at Coalinga, Cal., with a capital stock of $25,000, by W. L. Ebaugh, C. A. Martin, W. E. Holbert, C. Augee and R. W. Wales.

A ten-stamp ore mill is to be erected this summer by the Karnac Mining Company near Jamestown, Cal.

The Modern Auto Machine Shop has been incorporated at San Diego, Cal., with a capital stock of $25,000, by C. M. Orr and others.

The Lawndale Water Company, Los Angeles, Cal., will double its pumping capacity, replacing gas engines with electric motors.

Salt Lake City, Utah, is taking figures on a large dredger.

Government Purchases

WASHINGTON, D. C., July 18, 1910.

The Isthmian Canal Commission will open bids August 15, under circular No. 597, for furnishing the following supplies, being the annual estimate: 320 water meters, ⅝-in., and 25 water meters, ¾-in.

The Isthmian Canal Commission will open bids September 14, under circular 596, for furnishing and erecting machinery to operate the Stoney gate valves for controlling the main culverts and to operate the cylindrical valves for controlling the lateral culverts of the canal locks.

The Bureau of Yards and Docks, Navy Department, will open bids July 30 for condensers and piping for the power plant at New York.

The Isthmian Canal Commission opened bids July 7 for 160 boiler tubes and 40 tubular stays, as follows: Reading Iron Company, Reading, Pa., $516.22, shipment two weeks.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Liability of Employer for Negligence of Employee.—In Iowa an employer is not liable for injury to a workman resulting from the negligence of a fellow workman, where the employees are engaged in the same line of work, his obligation being discharged by providing a reasonably safe place for work, a sufficient number of competent workmen, the necessary appliances and proper materials. (Iowa Supreme Court, Hamm *vs.* Bettendorf Axle Company, 125 Northwestern Reporter 186.)

Duty to Employees Respecting Place of Work.—A vessel to which iron plates are being attached is a "structure" within the provisions of the New York labor law, which require employers to furnish safe scaffolding, &c., to employees working upon structures. (New York Supreme Court, Appellate Division, Fourth Department, Herman *vs.* P. H. Fitzgibbons Boiler Company, 120 New York Supplement 1074.)

Duty and Negligence of Employer.—An employer who uses a shop for storing metal beams must use reasonable care to make the floor safe, so as to avoid the falling of the beams upon employees working among them. An employer is liable for injury to an employee resulting from the former's negligence in omitting to provide a safe place to work, notwithstanding concurrent negligence of a fellow employee. (Iowa Supreme Court, Bell *vs.* Bettendorf Axle Company, 125 Northwestern Reporter 170.)

Duties of Employers to Employees.—An employee need not warn a workman against unexpected, improbable and unusual occurrences, but only against such probable consequences that may result in the exercise of proper care by the employee. An employee assumed the risk of injury from a dangerous condition which had occurred occasionally in the operation of a machine, where, with knowledge of the condition, he continued work without notifying the employer and without receiving assurance that the danger would be obviated. (Indiana Supreme Court, W. B. Conkey Company *vs.* Larsen, 91 Northwestern Reporter 163.)

Payment by Bills or Notes. Substitution of New Debtor.—While checks, duebills and similar instruments given to evidence an indebtedness are not payment until they themselves are paid, yet the contract between the parties may make them so. Where a creditor, holding an indebtedness against a single debtor, takes the joint duebill of this debtor and a third person, with a recital therein that it is in settlement of the account out of which the indebtedness arose, the creditor cannot thereafter sue the original debtor upon the account. (Georgia Court of Appeals, Lang vs. Shaw, 65 Southeastern Reporter 789.)

Description of Property in Chattel Mortgage.—A chattel mortgage covering "five wagons" is void for insufficiency of description where the mortgagor owns more than that number of wagons. (United States Circuit Court of Appeals, Eighth Circuit, *in re* Bothe, 173 Federal Reporter 597.)

Corporation Not "Citizen."—A corporation is not a "citizen" within the first section of the fourteenth amendment to the United States constitution, prohibiting the abridgment of privileges and immunities of citizens. (Indiana Supreme Court, Mutual Mfg. Company *vs.* Alspaugh, 91 Northeastern Reporter 504.)

Liability of Limited Partners.—A partner though not known in the business to creditors, and though receiving no profit from it, is liable for firm debts. (South Carolina Supreme Court, McGhee *vs.* Montgomery, 65 Southeastern Reporter 721.)

Liability of Agent Contracting in Own Name.—Sellers of machinery who sign a contract in their own name, which contract does not show upon its face that they were acting as agents for another, and is acted upon according to its terms, are bound thereby and cannot on suit for a breach thereof assert that they contracted merely as agents. (Washington Supreme Court, Gordon *vs.* Brinton, 104 Pacific Reporter 832.)

Satisfaction of Claims.—The cashing by a creditor of a check containing the words "paid in full," signed by the debtor, does not bar the creditor from claiming a further balance, unless there is a genuine dispute between the parties as to the amount due. (New York Supreme Court, Appellate Term, Caravia *vs.* Levy, 119 New York Supplement 160.)

Validity of Contract in Restraint of Trade.—An agreement by one selling stock in a corporation conducting a particular business, not to engage or become employed in the same line of business in the same town, unless for that company, is enforceable as a reasonable restraint of trade. (North Carolina Supreme Court, Anders *vs.* Gardner, 66 Southern Reporter 665.)

Acceptance of Orders for Goods.—In the absence of express authority a traveling salesman has authority only to solicit orders and transmit them to his concern for approval, and cannot make an absolute contract of sale. Where a company rejected an order for an article, and offered to return the amount of a check sent by plaintiff with the order, the fact that on receipt of the check it deposited the same for collection did not amount to an acceptance of the order. (Mississippi Supreme Court, L. A. Becker Company *vs.* Clardy, 51 Southern Reporter 211.)

Rights of Seller Under Installment Contract.—If one who agreed to execute promissory notes for the unpaid price of machinery payable in installments refused to do so, the seller could regard the contract of sale as terminated and sue for damages, or he could treat it as in force and sue for the installments as they matured, each default in the payment of the installments being the subject of an independent action. (Connecticut Supreme Court of Errors, House Cold Tire Setter Company *vs.* Ingraham, 75 Atlantic Reporter 80.)

Rights of Third Person Under Conditional Sale.—Under a lease of machinery with an agreement to sell at the expiration of the lease if the lessee performed certain conditions, a subsequent buyer for value without notice of the conditions attached to the sale acquired no greater rights than the lessee had under his contract. (Arkansas Supreme Court, Cullin-McCurdy Construction Company *vs.* Vulcan Iron Works,, 124 Southwestern Reporter 1023.)

Effect of Balance Struck in Bank Book.—Where a balance is struck in a pass book it becomes an account stated between the bank and the depositor, and the bank will be precluded from denying its liability as shown by that balance, unless fraud or error is shown. (Pennsylvania Supreme Court, Greenhalgh Company *vs.* Farmers' National Bank, 75 Atlantic Reporter 260.)

Rights Under Contract.—Where a contract provides for the sale of "about 1000 tons" of coal per month, each month stands by itself, and, if delivery during any month be waived, the seller cannot be required to make up the amount by delivering a greater quantity in a succeeding month. (New York Supreme Court, Appellate Division, First Department, Thedford *vs.* Herbert, 119 New York Supplement 1025.)

Agreement Not Constituting Monopoly.—An agreement between a manufacturer of goods under a secret process and a retail dealer, providing that the latter will not sell for less than the price fixed by the manufacturer, is not invalid as in restraint of trade, notwithstanding the provision of the California statutes that any contract by which anyone is restrained from exercising a lawful business shall be void. (California Supreme Court, Grogan *vs.* Chaffee, 105 Pacific Reporter 745.)

Validity of Reservation of Title to Heating Plant.—A heating plant installed in a building under an agreement with a building contractor to which the owner was not a party becomes a part of the building, and cannot be removed by the seller, though by such agreement he reserved title until payment of the purchase price. (Arkansas Supreme Court, Peck Hammond Company *vs.* Walnut Ridge District, 123 Southwestern Reporter 771.)

The Illinois Steel Company has made a change in its relations to the Scully Steel & Iron Company, Chicago, jobber of structural materials, plates and merchant bar steel. Formerly the Illinois Steel Company from time to time sold the Scully Steel & Iron Company a definite tonnage of these materials at agreed prices for extended deliveries, such deliveries in many instances running through several months. Hereafter the Illinois Steel Company will sell the Scully Steel & Iron Company its product at agreed prices from month to month, deliveries of these materials being made to the latter company from stocks which the Illinois Steel Company will carry under its ownership in the warehouses owned by the Scully Steel & Iron Company. A similar arrangement has been entered into by the Carnegie Steel Company, the National Tube Company and the American Sheet & Tin Plate Company with the Scully Steel & Iron Company relating to their respective materials.

The Taft-Pierce Mfg. Company, Woonsocket, R. I., announces that it has opened an office in Detroit at 1311 Majestic Building, where members of its staff will give attention to the designing and construction of special tools, jigs, fixtures, &c.

The Crucible Steel Company of America, Pittsburgh, has received a contract from the Government for 300 10-in. projectiles at $135 each and 700 8-in. at $74.95 each.

New Publications

Grades of Steel. By H. P. Parrock. Cloth bound; pages 55, 5 x 6½ in. Published by the author at Buffalo, N. Y.

Mr. Parrock has brought together in this booklet a considerable amount of data which promises to meet the end he had in mind, namely, to instruct the machinist and the tool maker, the final users of tool steel —the men upon whom the ultimate economies depend. The author emphasizes the increasing necessity of economy in steel, arguing that if it pays to select grades at $30 a ton it surely pays to choose carefully at $3000 per ton, however relatively small the more expensive item may be.

Illustrating the care taken to select the less expensive grades of steel various analyses are given, and the uses of steels of the different compositions are indicated. Some of these classes are dead soft basic, soft basic, tubing, tin bar, rivet, nut and screw, structural, hard structural, soft forging, forging, medium forging, hard forging, very hard forging and steel casting. Upwards of 150 analyses are given showing the variations in composition of steels adapted to the various uses enumerated. A very brief résume is given of methods of manufacture, the Bessemer and open hearth processes being referred to by way of introduction to the crucible process, since it is the product of the latter with which the booklet chiefly deals.

The crucible steels are taken up by the author under the headings, "Carbon Steels," "Carbon Alloys," "Special Gear Steels," "Self-Hardening" and "High Speed" steels. The tempering of carbon crucible steels and the hardening of high speed steels are treated with considerable detail, some of the data being reproduced from F. W. Taylor's monumental work on the "Art of Cutting Metals." Illustrations are given of different shapes of tools, and the great importance of shaping is properly pointed out, since the labor of shaping the steel usually exceeds the cost of the material. The author does not claim originality for his work, but he has done a great service in compressing into small space so much that is of value to tool users. Though a seller of tool steels, he does not hesitate to say that there is a great waste of money in the purchase and use of such steels. Here is an example of the suggestive features of the little book:

> The selection of tool steel for various purposes is a man's job. Large users of tool steels carry on experimental work all the time, tabulating brands, prices, cutting angles, hardening temperatures, drawing colors, cutting speeds, wear, waste and outputs; small users would do well to pool their interests for the same purpose, for it is probable that about three to four times as much tool steel is made and sold as is needed to do the work now required to be done. Two-thirds or more is lost; wasted, burned, badly worked—and the price stays up. The first chance of error in treating tools occurs at the heating to work to shape. Carbon steel breaks down very quickly and it pays well to spend plenty of time and care in shaping tools under the hammer. Even in heating to cut off a section be careful to keep carbon steels below a "red." Keep at medium red and cut slowly.

The hardness diagrams, of which there are several, are based on determinations by the Shore scleroscope. The author concludes with a page of suggestions on the handling of tool steels. He does well to call attention to the need of co-operation between the users and makers, and gives the former more of an idea than they ordinarily entertain of the care and precision that go into specifications and the treatment of steel. One of the striking comparisons, illustrating how large a factor labor is, puts the cost of steel in a given case at $4 and that of labor at $400. The author suggests that the user can quite well afford to pay double, or $8, for the steel, thus increasing the total cost by only 1 per cent., while in many cases doubling the yield, providing the user does not injure the $8 steel. "If, however, the $4 steel will make what we have to make and becomes scrap afterwards, it is the steel to use." The author is a member of the firm of Cadwell & Parrock, Buffalo.

Metallography. By Cecil H. Desch. Pages x + 432; 5 x 7¼ in. Illustrated with 14 plates and 108 figures. Price, $3, net. Published by Longmans, Green & Co., London and New York.

The author of this latest work on metallography, Dr. Cecil H. Desch, is Graham Young lecturer in Metallurgical Chemistry of the University of Glasgow. The book is one of the series of text books of physical chemistry edited by Sir William Ramsay, the previous members of which are already well known and appreciated. A few lines from the author's preface may be quoted as outlining the purpose of the book: "The study of metallic alloys by physical and microscopic methods has reached so great a development in recent years as to form a distinct branch of physical chemistry. In the following pages I have sought to present an account of the methods employed in this branch of study and of the conclusions which have been reached, and also to indicate the directions in which further research is needed."

The first chapter consists of an introduction, which begins with an admirable definition of metallography —namely: "The study of the internal structure of metals and alloys, and of its relation to their physical and mechanical properties." One of the most noticeable features of the introduction and of the whole book is the large number of accurate and valuable references given in the footnotes and the appendix. The next four chapters take up the Diagram of Thermal Equilibrium, thus recognizing the fundamental importance of thermal analysis in the study of alloys. A simple binary system of metals which are insoluble in each other is first considered, and a few pages are devoted to the bearing of the phase rule on this subject. In the same chapter is considered the case of a compound of the two metals being formed, and concrete examples are given. Then in succeeding chapters the cases are taken up where the metals are partly and wholly soluble in each other; those of ternary and more complex systems with a short chapter on metals, which are only partially miscible in the liquid state. These chapters are a good presentation of a difficult subject, and are greatly helped by the numerous diagrams and descriptions of typical examples.

The next three chapters are on Practical Pyrometry and Thermal Analysis; The Preparation of Micro Sections, and Microscopical Examinations of Prepared Sections. These relate to the practical part of metallography, and are about as detailed as the size of the book allows, but hardly sufficiently so for beginners in the science. Chapters 9, 10 and 11 deal with the Crystallization of Metals and Alloys, Undercooling and the Metastable State, and Diffusion in the Solid State. Chapter 10 is especially worthy of notice, clearly bringing out the importance of the metastable and labile states in alloys. Chapters 12 and 13 deal in an able manner with the physical properties of alloys that are used in investigating their constitution, but are of minor importance to pyrometry and microscopy.

Chapter 14 is on the Construction of the Equilibrium Diagram, the various lines composing the diagram being taken up in order. Chapter 15 deals with the little studied question of the Molecular Conditions of Metals in Alloys and the Nature of Intermetallic Compounds. Following this comes a very interesting consideration of Plastic Deformation, including a discussion of fatigue.

The last two chapters are brief presentations of the metallography of iron and steel and of some industrial alloys. The latter include the copper alloys, the alloys of gold, of aluminum, lead and tin, and bearing metals.

The book is the best presentation up to date of the

accomplishments in this comparatively new science, and is of especial value to those who are already somewhat familiar with it. G. B. W.

Power Required to Drive Rolling Mills.—By J. Puppe. Pages, 177; 7½ x 11 in. Illustrations, 29 figures, xi plates, 33 diagrams, and many illustrations without numerals, accompanying tables. Price, $4.50, net. Published by J. B. Lippincott Company, Philadelphia, 1910. London: Charles Griffin & Co., Ltd.

Dr. Puppe undertook in 1906 to carry out an extensive series of experiments to determine the power required to drive rolling mills. The tests were made at first in the electrically driven rolling mills at Peine, Germany. Later a heavy plate mill was taken up in the same way and afterwards two other mills. In December, 1906, the author solicited the support of the Verein Deutscher Eisenhüttenleute for the enlargement of the inquiry and finally this society appointed a commission to take the subject in hand and widen the scope of the work. The results of the commission's investigations were published in German in a special volume of which the title translated was "Experimental Investigations on the Power Required to Drive Rolling Mills." The commission decided to limit its inquiries to the power requirements of the passes for different shapes, with due consideration of the temperature and the mechanical properties, excluding the question as to the most suitable motive power. The experiments were carried out on six electrically driven trains, two of them double two-high trains for bars, two others three-high mills for rolling mine rails, while two were reversing mills. One of the latter was a blooming mill and the other had stands for rolling beams and rails.

In *The Iron Age* of March 11, 1909, five pages were devoted to a summation of the results of a portion of the inquiry and to diagrams and sections illustrating various passes and the power requirements for each. At that time the text of the commission's report existed only in German. The volume before us is a translation into English, together with all the tables and the voluminous data secured by the commission, these involving roundly about 200,000 calculations. The analysis of the various passes in each of the rollings is exhaustive and gives information never before presented in book form.

It is again true that the iron industry—in this case the rolling mill engineer, in particular—is under great obligation to the painstaking and the high technical ability of German engineers for data of the greatest value. Seventy-two tables in the Appendix to the report are devoted to the details of the tests and 29 sections are represented in the final forms of the finished material produced in the experiments. The translated work is certain to be in large demand among rolling mill engineers in the United States and Great Britain.

Principles and Practice of Iron Founding.—By E. L. Rhead. Pages, 505; 5¾ x 8¾ in.; illustrations, 247. Price, 7 shillings 6 pence, net. Published by the Scientific Publishing Company, Manchester, England.

The author states in his preface that the volume is the result of a series of lectures written up as articles for the technical press which were published during 1905 to 1908. The practice as described may then be assumed to represent English conditions at the present time. Glancing through the volume and comparing with the published reports of foundrymen's and other meetings in that country, one is inclined to believe that Mr. Rhead is in some respects a little in advance of actual conditions and more nearly at the American standpoint, especially in regard to the use of analyses in foundries. On the other hand, he is, perhaps, a little hard when stating that "there is probably no industry in which empiricism of the crudest type is more commonly to be met with." Thanks to our associations and an exceptionably able technical press along foundry lines, this condition would seem a long way behind us already.

One thing to be commended in the book is the getting down to basic principles as much as possible. The author rightly says that a man may be perfectly competent to get out first-class work without any knowledge of governing conditions or of influences determining the character of the materials he uses. But if these conditions or materials change, he is so badly left that it costs time and money to overcome the trouble he is certain to get into.

Mr. Rhead begins with the general physics and chemistry of cast iron, giving quite a lot of information. Perhaps the subject might be made simpler for the foundryman by interweaving it less with the microstructure of cast iron and by going more fully into mixture calculations, without the complication of manganese and phosphorus. The chapter on testing cast iron is not up to date, too much emphasis being laid on the now practically obsolete ½-in. test bar, while the standard American and German practice in this direction are omitted. If these had been given fully three-quarters of the chapter could have been cut off and the foundryman saved much unnecessary study.

The chapters on molding sand contain a lot of valuable information and bear out the general understanding that this end of foundry practice is better cared for in Europe than in this country. The same may be said to some extent of the chapters on molding, where the principles of the operations are discussed. Our molding practice, coming from England, will naturally be about the same. Cores and core machinery are next taken up and gone into extensively. Perhaps the illustrations could be improved in the book as a whole. One does not like to see advertising cuts included in a text book, particularly if they are very poor reproductions. Machine molding comes in for a special chapter, which each edition of Mr. Rhead's book will no doubt find greatly enlarged, particularly if our English friends emulate the American molding machine manufacturers and get up such great exhibits as those connected with the conventions of the American Foundrymen's Association. The stimulating effect of these side-by-side exhibitions of working machinery by business competitors cannot be overestimated in value to the industry at large. Chilled and malleable castings are discussed sufficiently for the purposes of the book, which concludes with a chapter each on the cupola, the blast and the air furnace.

The book on the whole will be more valuable in England than here, though well worth adding to the foundry library for comparison between English and American practice. R. M.

Work, Wages and Profits; Their Influence on the Cost of Living. By H. L. Gantt. Size, 5 x 7½ in.; pages, 194. Bound in cloth. Publisher, the *Engineering Magazine*, New York City.

In this work Mr. Gantt has gathered a number of his papers and articles which have been either presented before technical bodies or have been printed in the *Engineering Magazine* from time to time since 1904. The author was employed by Frederick W. Taylor in 1887 to assist in the development of a scientific solution of the problem of increasing the efficiency of workmen. The gathering of these articles in book form will enable students of modern methods of works management to secure conveniently most valuable data in the prosecution of their labors. The book is illustrated with colored diagrams showing comparisons of results accomplished under bonus op-

erations, as the efficiency of the workmen increases by such methods.

Elevators, Care and Operation.—Under this title the accident and liability department of the Aetna Life Insurance Company, Hartford, Conn., has published a pamphlet calling attention to certain matters in connection with the care and operation of elevators which should not be overlooked or neglected if accidents are to be prevented. These suggestions are divided into a number of groups, such as suggestions to the owner, engineer, passengers, operator, safety of equipment, and careful operation. The 47 pages of text are supplemented by illustrations of standard types of elevators, hoisting machines and accessories.

The first number of "Crane-ing," a monthly publication, has been issued by the Cleveland Crane & Engineering Company, Wickliffe, Ohio. It contains 16 pages, 4½ x 6 in., in addition to a cover with illustrated title page. The subject matter and dress are attractive. The magazine deals in part with Cleveland cranes, and is in part made up of entertaining paragraphs arranged after a manner that has been in vogue in individual company publications.

Obituary

CHARLES C. TOWNSEND, a well-known manufacturer and member of the firm of C. C. & E. P. Townsend, makers of wire nails and rivets, New Brighton, Pa., died at his home in that place on July 9. At an early age he became identified with the concern, which was then known as W. P. Townsend & Co., and at the time of his death was the president of its successor, C. C. & E. P. Townsend Company. The deceased was formerly a member of Congress from the Twenty-fourth Pennsylvania district.

HENRY HARRISON SMITH, president of the Diamond Iron Works, and a pioneer lumberman and manufacturer of Minneapolis, Minn., died at his home in that city July 2, aged 72 years. He was born in St. Stephens, N. B., and moved to Minnesota when he was 27 years old. He established the Diamond Iron Works 26 years ago and remained at the head of the company until his death. He also established the Diamond Boiler Works of the same city, of which company he was also president.

A. E. SILK, manager of the Hewell Belting Company, Chicago, died suddenly of heart failure in Detroit, July 12.

JUSTUS H. NIEDING, vice-president and treasurer of the Cleveland Iron Works Company, Cleveland, Ohio, formerly the Zeman Iron Works Company, died suddenly July 18, aged 51 years.

Fifteen of the 16 hot mills of the sheet mill department of the Youngstown Sheet & Tube Company, Youngstown, Ohio, have resumed operations. The new mills are manned largely by workmen from the old mills, supplemented by others hired within the past two months. Some of the day hands among the striking sheet mill men have returned to work. In addition to the sheet mills, the steel plant, four-lap weld and two-butt weld tube mills have also started up. Furnace C of the blast furnace department will be completed this week, but will not be blown in until August or possibly later. Furnace B will likely be blown out for repairs at the same time.

The Thomas Furnace Company blew out its furnace at Milwaukee, Wis., at the end of last week. The stock of pig iron on hand will be sufficient to take care of contracts for some time.

The Rationale of Dried Blast*

A Discussion of Qualitative and Quantitative Considerations

BY PROF. JOSEPH W. RICHARDS, SOUTH BETHLEHEM, PA.

The higher maximum temperature of the furnace gases in the smelting zone (region of the tuyeres) is the sole and the sufficient reason for the advantages produced by drying the blast. Removing the moisture of the blast results in saving the heat formerly required for its decomposition, and enables the furnace gases to attain a higher maximum temperature of combustion. The higher maximum temperature of the furnace gases quickens the rate of transfer of the necessary smelting heat to the slag and pig iron, and thus increases the rate of smelting.

The smelting down of slag and pig iron to the liquid and superheated state requires to have added to those materials, at a temperature at and above their melting points, their latent heats of fusion and the sensible heat of superheated liquid material. This is the principal thermal work done in the smelting zone of the furnace. It can only be accomplished by the agency of furnace gases possessing maximum temperatures far above the melting points of these materials, and is accomplished only by the sensible heat which these gases are able to give out in cooling down from their maximum temperature to the melting points of the slag and iron.

The Gain in Effective Smelting Heat

The sensible heat which the furnace gases possess above the melting points of the slag and iron is therefore the only effective smelting heat which they possess, and is a direct measure of their smelting capacity. Any rise in the maximum temperature of the furnace gases increases in a large proportion the part of their sensible heat available above this necessary smelting temperature and thus increases largely their smelting power. When the smelting power of the carbon burned in the tuyere region is increased, more iron and slag can be smelted per unit of carbon there oxidized, and therefore the fuel consumption in the smelting zone is greatly decreased per unit of pig iron produced. This decrease of carbon consumption in the smelting zone does not necessitate the use of more carbon for reducing purposes in the upper part of the furnace, because there is ordinarily produced in the smelting region by the oxygen of the blast such a large excess of CO gas that only a small fraction of it can be possibly used up in reducing the ore. The poor ratio of CO^2 to CO in the gases of the ordinary furnace is not due to imperfect reduction of ore by CO, but to the fact that such a great excess of CO gas is formed in the tuyere region that the oxygen of the ore can only convert a small fraction of this CO into CO^2.

The smaller amount of carbon consumed in the tuyere zone when using dried blast is therefore more perfectly changed into CO^2 in the upper part of the furnace, during the reduction of the ore, and therefore gives greater thermal service in the furnace per unit of carbon consumed. This improvement in the ratio of CO^2 to CO in the throat gases is a direct result of the smaller carbon requirement in the smelting region.

The smaller amount of carbon consumed per unit of pig iron, or of burden charged, results in a smaller volume of CO and N^2 gases rising through the furnace per unit of burden. They therefore perform reduction more thoroughly, and become cooler before leaving the furnace. While, therefore, the smelting zone is working hotter, the upper part of the furnace works cooler. Since the furnace works faster, the radiatrix and conductrix losses per day being no higher or even less than before, these losses expressed per unit of output

* A paper read at the International Congress of Mining and Metallurgy, Duesseldorf, Germany, June, 1910.

become lessened. Since less blast is required per unit of product, the stoves can heat it hotter and the blowing engines have less work to do, unless the blast is kept constant and the output increased to its maximum. In any case, the blowing engine power per unit of output is decreased.

Regularity and Uniformity

Besides these direct results of the higher temperature in the tuyere region, there are secondary advantages of removing or rendering uniformly low the moisture in the blast, which are of great value to the management of the furnace. These are the regularity of running, of output, of fuel consumption and of grade of pig iron produced. The manager does not have to fear sudden changes in the quality of iron produced, nor to carry an excess of fuel in the furnace charge in order to provide against such unforseen changes. This regularity gives such great relief to the manager that the practical man may well count it as the chief advantage, as far as he is concerned of using the dried blast.

But uniformity and regularity are only one side of the advantages of dried blast; the other side is the economy resulting directly from the absence of high moisture and the consequent high temperature in the tuyere region. Regular and uniform running at high efficiency is the combination which in its entirety has made such a great advance in practical blast furnace running with dried blast.

Reasons for Increased Output

With dry air blown upon incandescent carbon, the maximum temperature of the gaseous products of combustion, CO and N^2, will be 1678 degrees for cold blast, and 84 degrees hotter for every 100 degrees that the blast is heated. With moisture present in the blast, these temperatures may be reduced as much as 235 degrees when the air is warm and saturated with moisture, giving a theoretical maximum temperature of only 1443 degrees with unheated blast. Details of these calculations, and tabulation of temperatures for various atmospheric conditions and temperatures of blast may be found in the writer's "Metallurgical Calculations," Part II, pp. 282-286. As an illustration, if the outside air carries 40 g. of moisture per cubic meter and the blast is heated to 500 degrees, the maximum temperature of the gases of combustion in the tuyere region is 1848 degrees; while if the moisture is reduced to 5 g., and the blast temperature is unchanged, the maximum gas temperature rises to 2061 degrees.

Assuming a smelting temperature of 1250 degrees as required while melting is being performed, the first case gives an excess, or temperature head, of 598 degrees, available to transfer heat to the charge as it is being smelted; the second case gives an excess of 811 degrees, or an increase of temperature head of 213 degrees, or 36 per cent. Under these conditions, the furnace would smelt down charge approximately 36 per cent. faster with the dried blast than with the moist. Admittedly, these atmospheric conditions are extremes: The average increase on the Atlantic Coast of the United States has been 15 to 20 per cent. for the year's running. The three blast furnaces producing the largest number of tons of pig iron in 1909 in the United States were all three running on dried blast.

The increased smelting power per unit of carbon burned in the tuyere region, when using dried blast, is also calculable. When a kilogram of carbon is burned to CO, it evolves 2430 calories; if the blast necessary is preheated, there is added to this the sensible heat in the blast. The total available smelting heat per kilogram of carbon, using dry air blast, can be thus calculated:

Temperature of blast.	Available heat.
0 degrees	2,430 cal.
300 degrees	2,847 cal.
600 degrees	3,286 cal.
900 degrees	3,746 cal.

If, however, moisture is present, it rapidly absorbs heat and reduces the available heat in the smelting region. Its effect is, therefore, to leave less heat available at a lower initial maximum temperature. Taking again the example of blast at 500 degrees and air with 40 g. of moisture to the cubic meter, the total heat available is 3137 calories from combustion and the blast, diminished by 574 required to decompose the water vapor, leaving only 2563 calories available. The calories available for smelting purposes in the tuyere region is thus decreased 18 per cent. by the presence of the moisture. Remove this moisture, and the weight of carbon necessary to be burned in the tuyere region to do a given amount of smelting work will be reduced 18 per cent.; *i. e.*, the fuel requirement of the furnace will be reduced at least 18 per cent., calculating per unit of output. Other incidental advantages will increase the saving even above the calculated 18 per cent.

If less carbon is burned in the tuyere region per unit of output, the oxygen from the solid charges given off by reduction, and which is fixed in amount, will produce a relatively greater proportion of CO^2 in the issuing gases. This means that a greater proportion of the CO formed will be converted into CO^2, and therefore a greater utilization in the furnace of the calorific power of the carbon of the fuel. For example: If in a given furnace 75.3 kg. of carbon is burned at the tuyeres to CO, producing there 175 kg. of CO, and the solid charges give up in being reduced 41.8 kg. of oxygen, this can convert 73.15 kg. of CO into CO^2, and the total heat of oxydation of the carbon to this proportion of CO and CO^2 can be calculated as 6119 calories per kilogram of fixed carbon consumed. If, by using dried blast, 18 per cent. less carbon is thus consumed (giving, however, just as much available heat in the tuyere region and 61.75 kg. is burned to CO, producing 144.1 kg. of CO, 73.15 kg. of this will be likewise converted into CO^2 by the 41.8 kg. of oxygen from reduction (producing just the same amount of heat in the upper part of the furnace) and the total heat of oxydation of the carbon to this proportion of CO and CO^2 can be calculated as 6928 calories. The carbon burned in the furnace is therefore utilized with some 13 per cent. greater thermal efficiency when using the smaller quantity in the tuyere region required by dried blast.

Similar calculations could be made as to the smaller velocity with which the smaller amount of cooler gas passes through the upper part of the furnace, and the consequent better utilization of its reducing power and of its sensible heat in heating the descending charges. Analogous calculations could be made showing quantitatively the smaller radiatrix and conductrix loss per unit of product, when using dried blast. The data for such calculations are, however, not as abundant or as trustworthy as those already used. A longer experience with dried blast in practice will enable these data to be also used quantitatively, with convincing results.

Resume

The drying of the blast increases the available heat in calories in the smelting region per unit of carbon there consumed. This increase of available heat quantity increases correspondingly the maximum temperature of the gases in the smelting region.

The increased quantity of heat, available at a higher initial temperature, increases in a multiplied proportion the smelting power of the furnace; *i. e.*, increases the rate of smelting down in unit time and increases the quantity of smelting down done per unit of fuel.

As secondary or incidental results of these favorable conditions, the furnace works cooler above, the proportion of CO^2 to CO in the gases is increased, the radiatrix and conductrix losses are decreased per unit of output, and the furnace works with great regularity and uniformity.

FISCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Fluxes as Employed in the Brass Foundry*

BY ERWIN S. SPERRY, BRIDGEPORT, CONN.

In the early days of brass founding two things were guarded jealously: the mixture and the fluxes. At that time it was not an uncommon occurrence to hear one say, when speaking of a new proprietor of a brass foundry: "He will get along all right. His father left him all his formulas for mixtures and fluxes." It seemed to be taken for granted that even capital itself was subsidiary to these heirlooms. Soon the chemist began to make serious inroads into the mixtures, and their secrecy faded away gradually but surely. The mystery of the fluxes was more difficult to eliminate, as, unlike the castings themselves, they did not go beyond the foundry. They could not be analyzed without obtaining at least a small quantity, and this was difficult to do as the brass founder carefully guarded them and the materials from which they were made. In the course of time, however, the secret fluxes went the way of the brass mixtures so that by the process of evolution "secrets" finally became general technical knowledge. Few brass founders are now found who claim to have anything original or remarkable in the flux line.

Fluxes Overdone

When fluxes are mentioned it is frequently asked, What is their advantage, and are they actually necessary? To answer this question, I will say that I believe the flux question is greatly overdone and likewise imperfectly understood. It was only a short time ago that I discovered a brass founder using lime in making an 88-10-2 mixture from new metals. He said "somebody" had told him that it was good for bronze. Cheap substance that it is, he was wasting his lime, as it remained on the metal like so much dirt and had no more effect than sand. In another instance I found that a brass ingot maker used a couple of handfuls of a mixture of common salt and borax on the top of a pot of yellow brass after it had been skimmed and immediately before pouring. The mixture was thrown on, and then at once skimmed off without waiting for the borax even to stop swelling. He, too, would have been equally as well off without the flux. A diametrically opposite case was that of a brass founder who attempted to melt his emery grindings in a crucible without a flux, and obtained about a pint of metal and half a bushel of dross. In this case a flux was needed.

It hardly would be advisable to go into a detailed enumeration of all the fluxes known to mankind, and that can be used in brass melting as it would be of little value. Many substances once used for this purpose have now become obsolete, and many others have proved to be valueless. It seems preferable, therefore, to give a description of those fluxes that the test of time has proved valuable and the manner in which they should be used.

For Aluminum

For years those who melted aluminum used no fluxes at all on it, not even charcoal, as it was soon found that this material did more harm than good. On account of the lightness of aluminum, charcoal does not readily free itself and is apt to become entangled in the metal and produce small, black spots in the casting. It is within the past few years that a flux has become used. The one most extensively used and which has proved to be so valuable is chloride of zinc. It seems to react with the aluminum, forming chloride of aluminum and metallic zinc, which alloys with the aluminum. When this takes place the dross is changed to a fine, granular condition and is readily skimmed off. When aluminum is melted the surface is covered with a rather thick mass; but the chloride of aluminum will change it to a perfectly clear one closely resembling in appearance molten tin or lead. It is needless to say that such clean metal gives better castings.

The method of using chloride of zinc as a flux in melting aluminum is simple. Small pieces are thrown on the surface after the melting has been completed. Enough has been added when the surface is clear. A very small amount usually suffices, and for 50 lb. of aluminum a piece the size of a walnut is generally enough. The metal is stirred immediately after the addition and then skimmed. Those who have not used chloride of zinc should try it, as it is an excellent material.

For Nickel

The flux used by makers of nickel anodes has proved to be a good one. It was first used by A. M. Hill of New Haven, Conn., one of the first in the United States to make nickel anodes, and the inventor of the well-known "Hill barrel" for grinding brass furnace ashes. Mr. Hill has retired from the anode business, but for many years he used this flux with the best results. It is not only good but cheap. It is composed of the following:

Lime	3 parts
Fluorspar	1 part

The manner of making it is to take the lime and slake it as though mortar were to be made. Then stir in the flourspar and allow it to become solid. It is then broken up into small pieces for use.

While flourspar alone is a good flux it becomes very fluid when melted and rapidly attacks a crucible. I have seen a new plumbago crucible ruined in one heat when flourspar was used alone. It seemed to soak in and dissolve out the clay from the crucible mixture and leave nothing but the graphite. The crucible collapsed like an egg shell when grasped with the tongs. The use of the lime with the flourspar is to increase the melting point so that it will not so readily attack the crucible. The proportions previously mentioned have been found satisfactory for nickel. Less lime will render it more fusible.

This flux has been found particularly serviceable in melting old anodes, as it dissolves any earthy matter that may be on them. It is used for both new and old material, however, and may be called the standard flux for nickel. The proportions used are about a pint or a good handful for new nickel and twice this quantity for old material.

It must not be imagined, because the fluorspar is toned down with lime, that the flux will not act on the crucible, for it certainly will. The crucibles last only five or six heats. In this connection it should be borne in mind that all fluxes act on the crucible to a greater or less extent, otherwise they would not be of value as a flux.

For Copper

Probably more fluxes have been proposed or used for copper than for any other one metal or its alloys. The reason is that copper cannot be melted alone and yield sound castings. Practically every known chemical has been tried. In the selection of a flux for copper it should be known whether pure copper castings are to be made or whether it is to be alloyed to make brass or bronze.

* A paper read at the meeting of the American Brass Founders' Association, Detroit, Mich., June, 1910.

To make sound copper castings with a flux alone, and without the use of "physic" like silicon-copper, magnesium or similar materials (which, strictly speaking, are not fluxes), is a difficult matter. For this purpose I have found that yellow prussiate of potassium (potassium ferrocyanide) is excellent. With it sound copper castings can be made, but I do not advise it, as far better results may be obtained by the usual deoxidizing agents, such as silicon-copper, magnesium and phosphorus.

In melting copper for producing brass or bronze the question is different from the preceding one. For this purpose there is nothing better than common salt. Its value lies in the fact that it possesses the property of reducing any oxide of copper which may form during the melting. It has been used for many years in the brass industry.

Common salt is so efficacious in reducing oxide of copper that as far back as 1882 R. Monger, in the *Chemical News,* proposed it as a means for determining the quantity of oxide that copper contains. His method was to melt salt in a clay crucible and then drop in the weighed sample of copper. After allowing it to remain for a short time the crucible was cooled and broken when the button of pure copper was obtained. The difference in weight gave the amount of oxygen (or its equivalent of oxide of copper). Some very satisfactory results were cited.

In melting copper for making brass or bronze, about a handful of salt is used and is preferably put in after it has begun to melt. If introduced with the copper it melts before it and is apt to volatilize and waste. The action on the crucible is also greater. Too much salt produces a liquid that is apt to penetrate the crucible like fluorspar, although not as violently or as rapidly. The amount of salt previously given is used for a pot of metal holding about 150 lb. The quantity need not be exact, as a variation either way does no harm as long as a sufficient quantity is used to do the work. The theory of the action of the common salt seems to be that, at the temperature of the molten copper, it breaks up or dissociates into metallic sodium and chlorine gas. The latter escapes and the sodium performs its work in deoxidizing.

For Brass

The flux almost universally and exclusively employed in brass melting is common salt. As previously mentioned, its action is to reduce the oxide of copper formed in melting the copper previous to the addition of the spelter. The brass rolling mills in the Naugatuck Valley, Connecticut, and elsewhere all use it, and one large company uses approximately half a ton a day. It is the universal and only flux used in making brass for rolling. For years it has been employed for this purpose, and in my own remembrance always has been. It seems to give all that is desired and has the distinct advantage of being cheap. Any kind of salt will answer and a pure material is unnecessary.

The quantity used is about a handful to the crucible. One concern uses one handful, while another believes that double this quantity should be used. A good sized handful, however, seems to be sufficient. It is added after the copper begins to melt, as this appears to be the best time to introduce it. When the right conditions have been produced there will be a little slag on the top of the brass when it is skimmed.

It is worthy of note that, although every brass rolling mill uses salt in brass melting, few brass founders who make sand castings employ it. Many of them never have heard of it and others seem to think it is a waste of time. I advocate its use under all conditions, and as it is theoretically correct, has been found by actual practice to improve the quality of the brass and is so cheap that the cost of the brass is not appreciably increased, it seems to me that every brass founder should use it, whether he makes new metal or melts scrap, as the character of his castings will be improved.

For Bronze and Composition

What has been said about the use of common salt in melting yellow brass applies equally well to composition or bronze, and it is used in identically the same manner and in the same quantities. It makes no difference whether phosphorus or other deoxidizing agents are employed, the salt is used just the same.

For German Silver

German silver is such a refractory material in the rolling mill that much time and thought have been given the subject of a suitable flux for it. It is a singular fact that the bulk of the German silver manufactured in the United States is made by two concerns. One uses a flux in making it, while the other uses none. In justice to the concern which uses no flux at all, I will say that their German silver has a little better reputation, and they have the more particular trade. I cite these examples simply to indicate that fluxes do not constitute the "secret" of making German silver by any means.

The use of the flux by the other concern dates back to 1869, when Frederic Wilcox, a brass caster who was engaged in making German silver, had trouble with black, minute spots in his metal. Tradition states that he gave the matter much thought, and finally believed it was caused by carbon in the metal. More thought indicated to him that the only method of removing it was to use a nitrate of some kind which would evolve oxygen and oxidize the carbon. Nitrate of soda, therefore, was used, and upon its use in German silver he obtained a patent (U. S. Patent No. 96,524, November 2, 1869). As this material was found to work better with black oxide of manganese, the two afterward were used together and now constitute the flux of the aforesaid concern.

Personally, I doubt if this flux has much value, and the fact that it is possible to make good German silver without it would seem to point that way. I feel quite sure that there is no oxidation of carbon, as nitrate of soda, when allowed to melt on copper, will not oxidize it, but instead will actually render it sounder. It is also a singular fact, which I have already demonstrated in practice, that a mixture of nitrate of soda or the nitrate of potash (nitre), mixed with black oxide of manganese and used as a flux on copper, will actually introduce metallic manganese into the copper, showing that there is a reducing action. This explains, I believe, the reason for the action of the flux. A slight amount of manganese is introduced. This is also borne out by the fact that within the last few years, metallic manganese has come into use as a deoxidizing agent for German silver and similar nickel alloys. Its use is preferable to introducing manganese through the agency of a flux as the results are then positive and certain, and predetermined amounts of manganese always can be added. Its use has been attended with excellent results, and it seems to be the natural deoxidizing agent for nickel and nickel alloys.

In making German silver common salt is used in the same manner, and with the same results as those obtained in brass and bronze.

For Washings, Grindings, Etc.

In the melting of washings from the reclaiming of brass foundry ashes, a flux must be used in the majority of instances unless they have been washed very clean, and this is rarely done. Even with clean washings a flux is advisable. The same rule applies to grindings, skimmings and similar waste materials. Unless a flux is used when they are melted a union of the particles of metal is prevented by the presence of so much foreign matter, and instead of fluid metal there

usually is obtained a small quantity in the bottom of the crucible and a large mass of pasty material fritted together. When a flux is used the foreign matter is dissolved and clean metal is left.

For use in melting brass, bronze or composition washings, grindings, skimmings and similar material, I have found nothing better than plaster of Paris. It is a cheap and excellent flux for this purpose. How far back it was employed for this purpose I cannot say, but it was first called to my attention in 1890 by the late C. S. Moore. With due respect to him, I believe he can really be called the father of the present scrap metal industry in the United States, as he was responsible for many innovations (like the "transmutation" of yellow washings into red), and I firmly believe he was the first to use plaster of Paris as a flux. He informed me to this effect and I have no reason to doubt his word.

The value of plaster of Paris as a flux in melting washings, grindings and similar material is that it possesses the property of dissolving what foreign matter may be present in the shape of sand, slag or oxide, and it has practically no action on the crucible. In addition, it is quite cheap. On account of the fact that it has no action on the crucible, any desired quantity can be used. It melts readily and forms a thin slag.

To melt washings or grindings with plaster of paris, mix about 5 lb. of it with the washings when they are placed in the crucible. Then melt in the usual manner. If the slag at the conclusion of the melt is not sufficiently fluid, more should be added. When the metal is completely melted pour the entire contents of the crucible into ingot molds. Do not attempt to skim it. The slag will run into the molds with the metal and rise to the top. Allow the mass to cool and then dump the ingot molds. The slag of plaster of Paris can be readily detached by a blow from a hammer, or it usually will fall off under normal conditions. If desired, it may be used again. It will be found a very satisfactory flux for this purpose.

Plaster of Paris is calcium sulphate, and when used as a flux the action seems to be one of simple solution: The molten plaster dissolves the foreign matter as sugar is dissolved by water.

When coal is present in washings, as it usually is, there is a slight reduction of the sulphate to sulphide and there will be an odor of sulphur during the melting. This seems to do no harm, and I have never been able to find that it injures the metal. In fact, it appears to act in an opposite manner, and any iron that may be present is changed to sulphide and enters the slag. I have always advocated the use of plaster of Paris in melting scrap materials containing iron, and have invariably found it to be followed by good results.

The Necessity of Charcoal

I have made no previous mention of the use of charcoal for the reason that it is not properly a flux, although it takes the place of one. I can say without hesitation that charcoal should be used as a covering in melting all the metals previously enumerated. Its value lies in the fact that in burning it supplies a reducing atmosphere and thus prevents the oxidation of the molten metal. At the same time it covers the metal and prevents the products of combustion from coming in contact with it. It is free from sulphur, which renders it the ideal material for this purpose. It should be coarsely granulated and not powdered so as to allow its covering the metal completely without danger of immediate combustion. Fine coke or coal, although frequently used, is much inferior to charcoal as it contains more or less sulphur, which injures fine grades of metal.

The blast furnace of the Clinton Iron & Steel Company, which went out of blast April 10 for general repairs, was blown in on Saturday, July 16.

Personal

J. C. Bunten, manager and director of the Anderston Foundry Company, Glasgow, Scotland, is spending a few weeks in this country and Canada. He is making his business headquarters while here with Thomas A. Lewis, 50 Church street.

F. W. Jaeger, manager of the American office of Alfred Schutte, 90 West street, New York, sailed for Europe July 14, to be absent four weeks or more.

Walter B. Snow, publicity engineer, Boston, Mass., has added to his staff H. Ross Callaway.

The Wagner Electric Mfg. Company, St. Louis, announces the removal of its Charlotte, N. C., office to the Woodward Building, Birmingham, Ala., to be in charge of J. F. Jones. North and South Carolina, which have heretofore been handled from the Charlotte office, will now be handled from the Philadelphia office, which is located in the Real Estate Trust Building, in charge of John Mustard.

Sylvester S. Howell has become associated with Paul M. Chamberlain, engineer, Marquette Building, Chicago, under the firm name of Chamberlain & Howell. The firm will carry on the designing and consulting engineering practice established by Mr. Chamberlain.

C. H. Todd of Washington, Pa., has been elected president of the Petroleum Iron Works Company, Sharon, Pa., in the place of E. G. Wright, resigned. Mr. Todd was one of the founders of the company. The plant is running full, with sufficient orders booked to insure steady operation for several months.

J. O. Henshaw, New York, resident partner of Hickman, Williams & Co., sailed for Europe last week.

Louis M. Henoch, identified for many years with the sale of iron and steel from store at Chicago, has become treasurer of the Scully Steel & Iron Company.

Clyde M. Carr, vice-president and general manager of Joseph T. Ryerson & Son, Chicago, has returned from Europe after an absence of two months.

William J. Diehl has resigned as auditor of the Manufacturers' Light & Heat Company, Pittsburgh, effective August 1, and has accepted a similar position with the Arkansas Natural Gas Company at Pittsburgh.

O. E. Reinhardt, formerly identified with the Carnegie Steel Company, at South Sharon, Pa., has been made manager of sales of the Radium Spray Company in the western Pennsylvania district, with offices at Sharon, Pa.

Fred N. Beegle, president of the Union Drawn Steel Company, Beaver Falls, Pa., has sailed for Europe, and will combine business with pleasure.

S. S. Stewart, formerly Pittsburgh representative of the Foster Engineering Company, with offices in the Park Building, has resigned his position to engage in street railway building in Iowa.

E. H. Jennings has resigned as president of the Manufacturers' Light & Heat Company at Pittsburgh. His successor will probably be elected at a meeting of the directors of the company to be held July 26.

J. I. Buchanan of Pittsburgh has been elected a director of the Manufacturers' Light & Heat Company, succeeding Thomas Alexander of Franklin, Pa., resigned.

J. J. Connelly has been appointed general manager of the Air Tight Tank Company, with offices in the Oliver Building, Pittsburgh.

The Massillon Rolling Mill Company, Massillon, Ohio, has increased its capital stock from $200,000 to $1,000,000. The increase is made to provide treasury stock to be sold in case it is found necessary to enlarge the business or make extensive improvements.

Allis-Chalmers Pumping Engines for Grand Rapids

In the last few years Grand Rapids, Mich., has probably done more in the way of municipal improvements than any other city of the same size in the country. The first one, the straightening and deeping of the Grand River, and the building of retaining walls to confine the stream in its new channel, was a big undertaking in itself. This was followed by the construction of a complete system of intercepting sewers and pumping stations to free the river from pollution, and at the present time the pumping equipment of the water works is being added to. The next step looks toward the housing of the water works and the electric light station in a single structure, and probably it will be only a short time before this is done.

The new equipment under construction for the pumping station is a vertical triple expansion condensing crank and flywheel Corliss pumping engine built by the Allis-Chalmers Company, Milwaukee, Wis. Fig. 1 is a view of the steam end, while Fig. 2 illustrates the water end. As will be seen by the engravings which are reproduced from photographs taken in the company's shop, this pumping engine embodies the most advanced ideas in the engine builder's art. Some of the features which will attract the engineer's interest are tubular frame, Corliss valves for the high pressure and poppet valves for the low pressure steam, jacketed cylinders and outside packed plungers. The engine is equipped with steam cylinders 28, 50 and 74 in. in diameter and uses steam at a pressure of 140 lb. This pump has a capacity of 12,000,000 gal. per 24-hour day, against a head of 251 ft., and is intended to provide for the future needs of the city for some time, as it is stated that this style of pumping engine develops a duty which cannot be equaled by any other type.

Fig. 1.—Steam End of the Vertical Triple Expansion Pumping Engine Built by the Allis-Chalmers Company, Milwaukee, Wis.

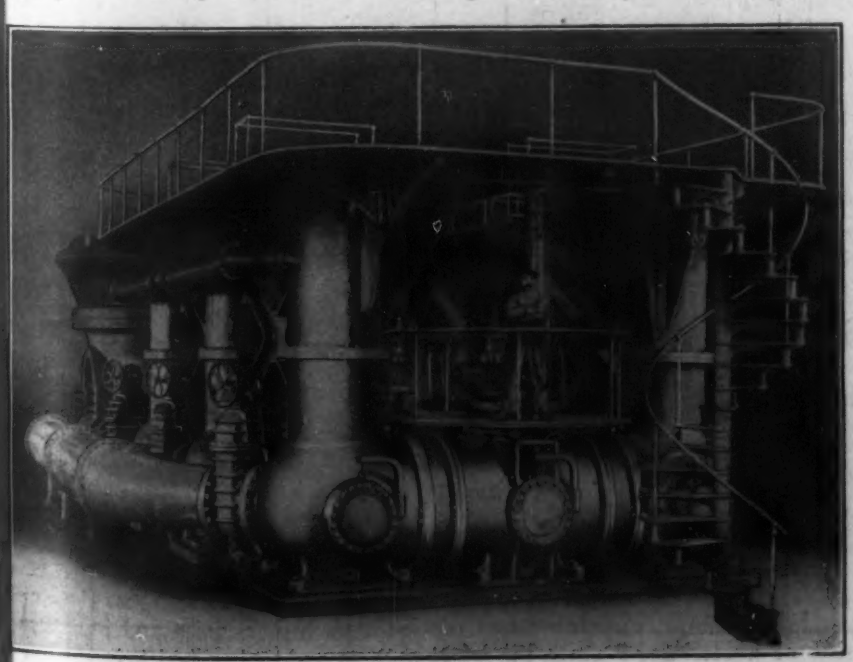


Fig. 2.—Water End of a 12,000,000-Gal. Pumping Engine Built for the City of Grand Rapids, Mich.

New England Foundrymen's Outing.—The New England Foundrymen's Association held the first of its summer outings at Mt. Tom, Holyoke, Mass., July 13. A good sized company from Boston, under the leadership of Secretary Fred F. Stockwell, was joined by guests and members from western Massachusetts, Connecticut and Rhode Island. Dinner was served on the summit of the mountain, the wonderful view from which was much enjoyed. After dinner the Committee of Arrangements, headed by Charles L. Newcomb, general manager of the Deane Steam Pump Company branch of the International Steam Pump Company, took the party for an automobile trip through the adjacent country, including Holyoke, Northampton and Hadley, to the Nyassett Club of Springfield, where the members were Mr. Newcomb's guests. The Deane Excelsior Quartette, composed of employees of the Deane Steam Pump Company, provided vocal music.

Hickman, Williams & Co. announce that the Virginia Iron, Coal & Coke Company, Roanoke, Va., has decided that its best interests will be conserved by allowing any agent to offer its brands of iron rather than to sell them exclusively through its sales offices as heretofore. Hickman, Williams & Co. state that they will continue to sell the brands of this company, which include Dora, Crozer, Radford, Max Meadows, Bristol and Watts, and will be able to make as low prices and as liberal terms as any one.

A 15-Ton Hulett Ore Unloader

A New Machine with 50 Per Cent. Increase in Bucket Load and with Receiving Hopper, Larry Car and Mechanism for Weighing the Ore

BY WALTER G. STEPHAN.

Some years ago, when George H. Hulett had perfected the design of his 10-ton automatic ore unloader and the machine itself had demonstrated its practicability and its great speed, the opinion was frequently ventured by men experienced in this line that the limiting size of a single unloading unit had been reached. They believed that further development must be in the direction of smaller sized units which would be handled more rapidly in order to increase the capacity. This theory seemed to be entirely sound to every one except Mr. Hulett himself, whose genius for stupendous undertakings, where other men would hardly dare to risk their reputation, is well known to the iron ore interests. He not only proposed a machine of 15 tons capacity (which is one-half again as large as the former type), but has actually built four unloaders which are being operated with great success at the Lake Shore docks of the Pittsburgh & Conneaut Dock Company at Ashtabula Harbor, Ohio. Seven other similar 15-ton unloaders are now building—four for the Lake Shore & Michigan Southern Railroad at its docks at the same harbor, and three for others. These will be ready for operation in a very few months. These two new plants will give to Ashtabula two of the most modern docks on the Great Lakes and will add very greatly to the ore unloading facilities at that port.

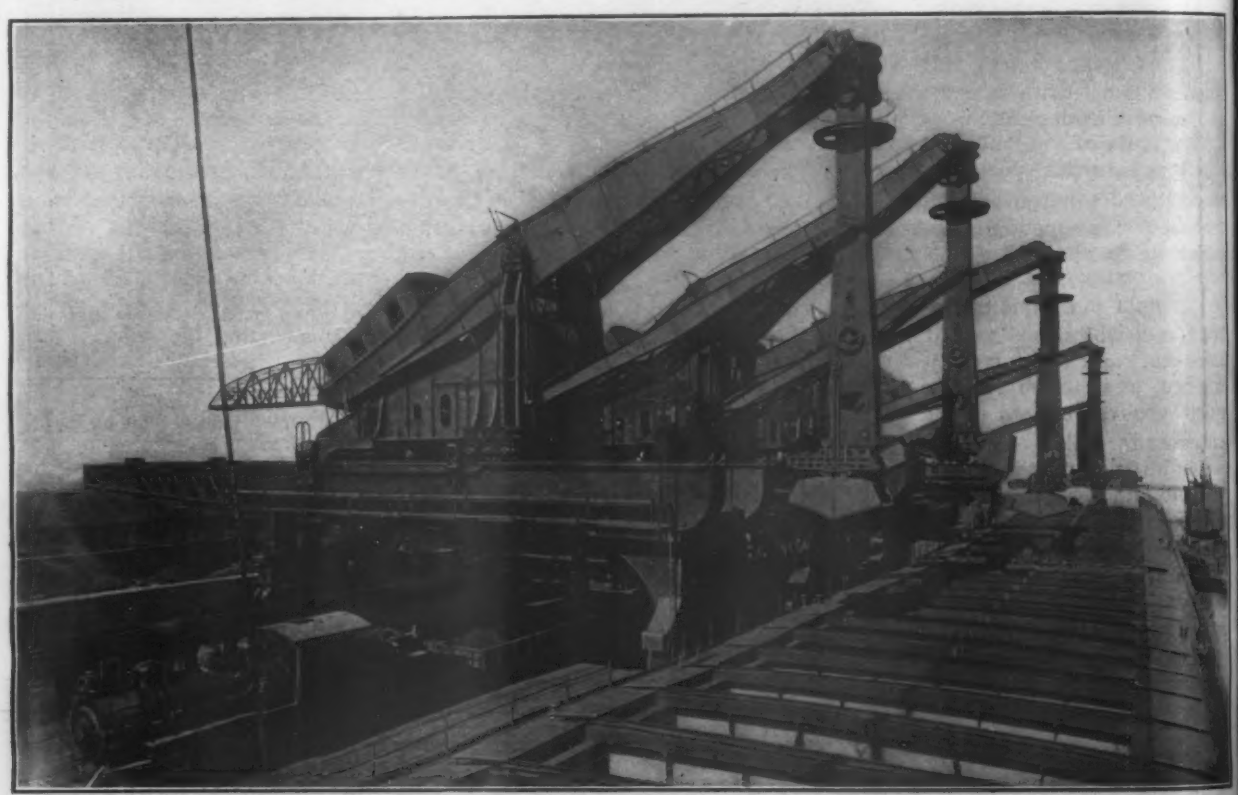


Fig. 1.—Battery of Four 15-Ton Hulett Ore Unloaders at the Lake Shore Docks at Ashtabula Harbor, Ohio.

Fig. 1 gives a good view of the complete battery of four unloaders, while Fig. 2 is a view of a single machine, showing the details of design and operation to good advantage. The distinguishing features of the new unloader are the 15-ton bucket and the mechanism for weighing the ore, which consists of a receiving hopper at the front end of the machine, together with a larry car traveling on tracks underneath and carrying an operator who does all the weighing of the ore. These new features it is the principal object of this article to describe.

General Features

Naturally, the first impression of this new unloader is one of its great capacity. It hardly seems possible that a bucket of 15 tons capacity can be guided through the hatches and into the hold of a modern ore boat, but the facility with which this is accomplished is astonishnng. The writer had the pleasure of a trip with the man in the bucket leg of one of the machines and could not help admiring the skill of the operator in handling so huge a bucket. The sensation was one of smooth, even movement under perfect control, and the ore was picked up with seemingly little effort, the bucket filling to the brim every time it landed on the ore pile. It averages 30,000 lb. per trip throughout the day's run and has lifted as much as 42,000 lb. at one time by actual weight. Another fact worth mentioning is the arrangement by which the entire bucket "shoe" can be removed from the "leg" for repairs. It is evident that the "shoe" on a Hulett bucket leg sometimes wears out and needs "resoling." The arrangement is clearly shown in Fig. 3 which shows the bucket "cleaning up" in the hold of a modern ore boat. The operators do not always have such a clear space to work in, but the modern ore boats are all being built along these lines.

Instead of these much larger machines looking clumsy and unwieldy, there is a poise and symmetry about the walking beam and trolley which is pleasing to the eye. Solid web plates are used extensively, giving a satisfactory impression of stiffness and rigidity.

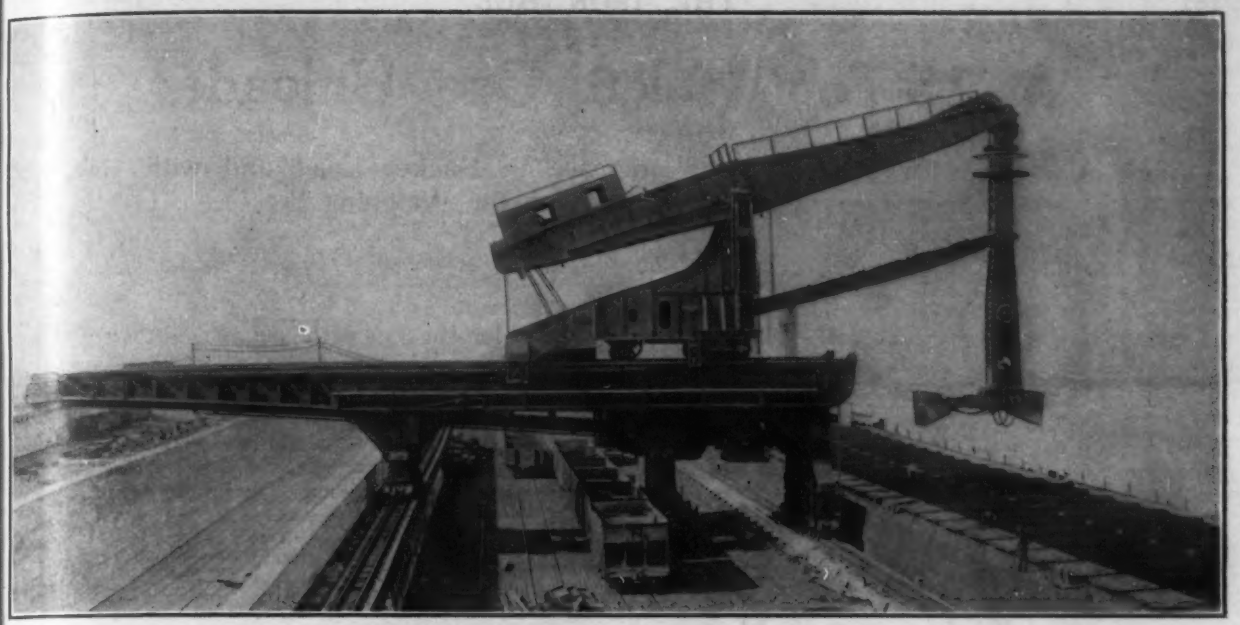


Fig. 2.—View of 15-Ton Hulett Unloader Showing Underneath the Larry Car.

The trunnion bearing and support at the top of the leg is also neat in design.

The lines of the trolley are graceful and clean cut. The rear wheel supports consist of a box girder extending across the back of the trolley at each end where the wheels are supported. The wheels run on inverted tracks which are riveted to the main girders about on the level with their top flanges. The conduit rails carrying current to the trolley are fastened on insulated brackets at the lower side of the main girders, and a structural bracket carrying the sliding contacts is dropped from the trolley frame. Each of the front trolley trucks consists of six wheels, the load being equalized by means of heavy coil springs. The trolley is provided with the usual safety devices consisting of solenoid and mechanical brakes and electrical cut-outs, as have been previously described in connection with the 10-ton unloader.*

The main girders span five standard railroad tracks with ample overhead clearance for switching locomotives. The distance center to center of front and rear legs is 71 ft., the front legs being set back 5 ft. from the face of the dock. Both legs are of solid plate construction and rest upon equalized trucks running on two rails. There are four 4-wheel trucks under the front leg, the two outside ones being driven and the two inside being idler trucks. Notwithstanding the increase in total load of the entire machine, the wheel load is not as great as on the 5-ton gravity machines in use along the Great Lakes. Supporting the rear leg are four 4-wheel equalized trucks, the two outside being driven and the center ones being idlers. Unlike the 10-ton unloader, there is no operator's house on the rear leg. The moving mechanism is located on the front side of one of the girders, and it is operated by the man in the larry car, which will be described later. The operating levers are located above the front leg, and the man in the larry car can step from the car to a platform within easy reach of them. No rail clamps are used, the heavy moving brake always being set, except when the operator has his weight on the lever.

* *The Iron Age*, October 8, 1908, page 985.

Fig. 3.—Hulett Bucket "Cleaning Up" in the Hold of a Modern Ore Boat. The Entire Bucket "Shoe" May Be Removed from the "Leg" for Repairs.

All the moving gears are steel cut gears and all are well guarded.

The main girders are extended at the rear to form cantilevers 56 ft. long, which overhang the usual concrete trough for storing the ore temporarily, until it can be rehandled to the stock pile. A noticeable feature is the absence of lateral bracing on the main girders, the omission adding much to the neater appearance of the whole machine. Direct current at 220 volts is supplied for the entire battery of unloaders by two insulated rail conduits running along the inside face of the concrete wall supporting the rear trucks.

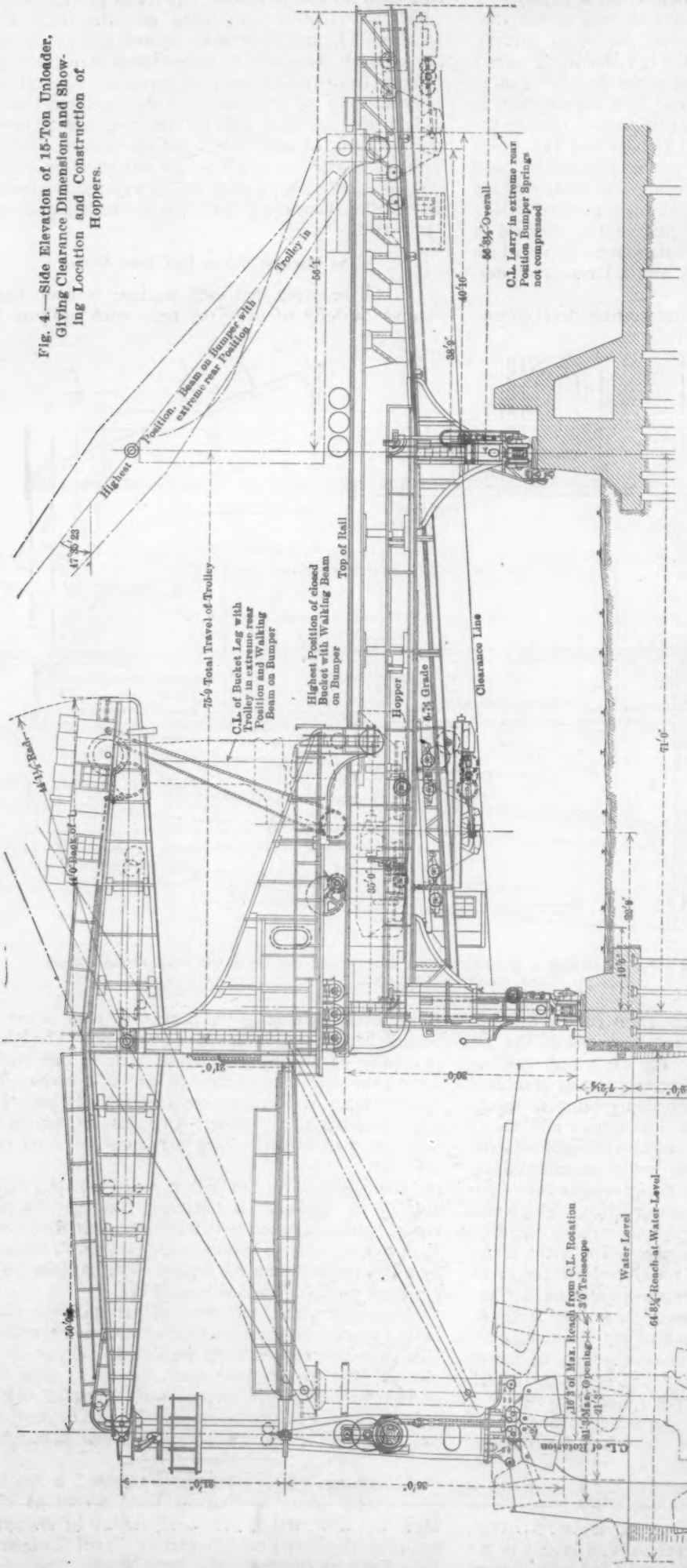

Trolley in
Position. Beam on Bumper with extreme rear Position
Highest
C.L. Larry in extreme rear Position Bumper Springs not compressed
Overall
Top of Rail
Hopper
6:12 Grade
Clearance Line
Highest Position of closed Bucket with Walking Beam on Bumper
C.L. of Bucket Leg with Trolley in extreme rear Position and Walking Beam on Bumper
70'9 Total Travel of Trolley
Water Level
Reach-at-Water-Level
Max. Reach of open Bucket at 10'8½" below Top of Rail
C.L. of Rotation

Fig. 4.—Side Elevation of 15-Ton Unloader, Giving Clearance Dimensions and Showing Location and Construction of Hoppers.

The Weighing Mechanism and Larry Car

By far the most interesting new feature on these large machines is the apparatus for weighing the ore and delivering it from the bucket to railroad cars or to the trough at the rear. One can see that a great deal of careful attention was paid to this part of the design with most satisfactory results. The weighing device has been tested repeatedly, and it was found to be even more reliable than track scales. This to the ore shipper is a most valuable and attractive devolopment in ore unloading because it saves a great deal of time and trouble in switching cars back and forth to correct and check up their weights.

In order to appreciate the details of the weighing appliances on these Hulett monsters, one must realize that next to reliability, the designer of an ore unloading machine desires to secure speed, or, in other words, great capacity per hour. The ore season is short and less time consumed in unloading means more trips per boat per season, as well as less wear and tear upon the boat captain's good nature. For the reasons just given, the Hulett unloader is so designed that the bucket can deliver its contents, not into the railroad car or ore trough at the rear, as one might suppose, but at the earliest possible moment into an ore hopper located at the very front end of the machine between the main girders. Then, while the bucket is returning

for another "bite," the last bucketful can be carried to its destination, thus saving a great deal of time.

The ore hopper just mentioned has a capacity of four full buckets, and is mounted on four wheels running on I-beam tracks between the main girders. Ordinarily it is stationary, but it is mounted on wheels for the purpose of removal when the bucket leg is to be lowered through the girders. The hopper itself is divided into two sections conical in shape. Closing the bottom of each is a horizontal circular flat disk which can be rotated in a horizontal plane by means of bevel gearing and an adjustable coupling and shaft running to a motor on the outside of the main girders. Along the center line of the hopper and slightly inclined to the axis of each disk is a stationary plow which scrapes the ore off of the disk into a larry car underneath the ore hopper.

This larry car is a most interesting development, since it carries in a cage at the front end its own operator, who controls all of the operations of the car and who also weighs the ore. The car hopper is of 30 tons capacity, and is shaped like an inverted truncated pyramid, the lower discharge opening being closed by double swinging gates which are opened and closed by a 25-hp. motor through worm and spur gearing and connecting rods. The hopper is suspended from the main frame of the car by heavy weight rods similar to the usual scale hopper construction. The levers are connected to two scale beams, which stand in front of the operator in the cage. The main frame rests upon eight equalized wheels which travel on rails suspended between the main girders on a 7 per cent. grade. The car is moved back and forth on these tracks from the front end of the machine to the extreme rear position above the ore trough, by means of two drums located on the car at its rear end. These drums are driven through spur gearing by a 125-hp. motor. Two 1-in. ropes wind on and off of them and operate to move the car to any desired position.

By an ingenious arrangement of the scale beams it is possible for the weighman to weigh and load 25 tons into one end of a 50-ton ore car on the track below, return and weigh 25 tons additional and load it in the other end of the ore car, with only two movements of the scale beam weights. At the same time the total weight delivered to the railroad car below is registered on a card for official record. As stated previously, this weight is reliable, even more so than track scale weights. The simplicity of the system is very striking, the operator being able to weigh faster than the empty cars can be delivered under the machine. The railroad companies do no reweighing of the cars, but place a weighmaster of their own on the larry car to record the weighing of each load. At the present time the cars are handled to and from the unloaders by switching locomotives, but a cable haulage system is about to be installed, which will facilitate the handling of cars very greatly.

The Machine Stores 105 Tons of Ore

It will be noted that each machine in itself has a storage capacity of over 105 tons, while waiting for empty cars—15 tons in the bucket, 60 tons in the receiving hopper and 30 tons in the larry car. The bucket is capable of making a complete cycle in one minute during the unloading of the first part of a cargo. The regular force of operators required for this battery of four unloaders is as follows: One man in each bucket leg; one man in each scale larry; one oiler on each machine.

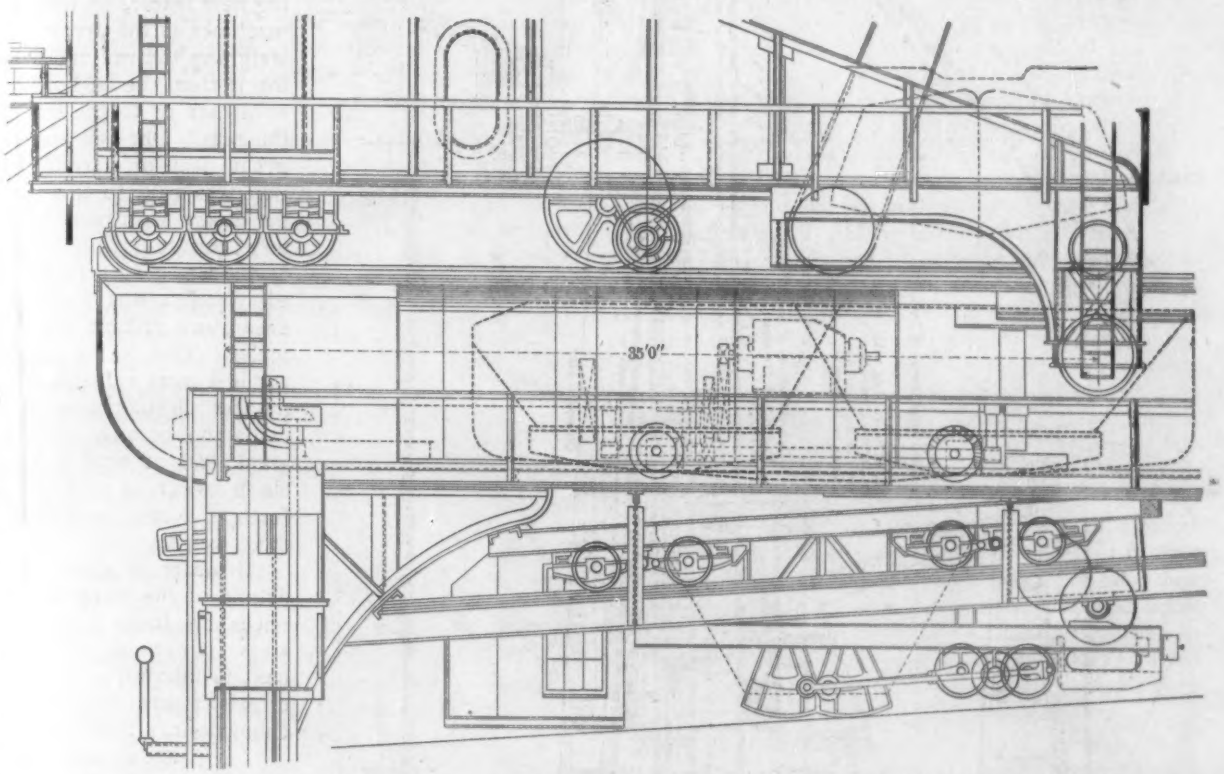


Fig. 5.—Enlarged View of a Portion of Fig. 4, Showing 60-Ton Hopper and the Larry Car with 30-Ton Hopper and Weighing Mechanism.

The length of the ore dock is about 1100 ft. At the rear of the machines is the usual concrete V-shaped trough which is paved with steel rails laid lengthwise. Back of the trough is the ore stock yard which is served by a Hoover & Mason ore bridge. The capacity of the ore stock yard is 1,000,000 tons of ore.

No attempt has been made to ascertain the maximum capacity of these machines; still, some remarkable unloading records have been made. On one occasion in June of this year when the docks were congested, three large ore carriers were unloaded and the fourth cargo was started in one day. The total ore unloaded for the day was something over 34,000 tons.

"Exchange Value of Farm Products" is the title of a speech made by Senator Reed Smoot of Utah May 27, 1910, which has been issued in document form by the American Protective Tariff League of New York as document No. 99.

Sir Andrew Noble

Notable Jubilee of the Chairman of Armstrong, Whitworth & Co., Ltd.

BY ROBERT I. CLEGG.

Andrew Noble and some 25,000 men work together. For 50 years ago Andrew Noble joined the mammoth manufacturing organization of which he is now chief, and in September this long service of the scientist is to be appropriately celebrated. This student of steel, shot and guns, afloat and ashore, was born in Greenock, near Glasgow, on September 13, 1832, the son of a naval officer. His mother was an American and therefore Andrew Noble is all the more of interesting ancestry to us. He early manifested a leaning toward a military career and was in due course entered as a student at the Royal Military Academy at Woolwich. Subsequently he became identified with the Royal Artillery and by the year 1855 he had attained a captaincy. As Captain Noble he was known until 1893, when knighthood was conferred upon him by Queen Victoria. In 1903 he received the rank of baronet.

Returning to Andrew Noble's army career, we find him in 1857 secretary of the Royal Artillery Institution at a time when Great Britain trembled under the shock of a great war. From the climax of the Crimea came immediately the inception of the classic researches of Noble as well as of Whitworth. The former naturally became identified with the heavier ordnance, and the latter for a time investigated small bore armament. But the two were not of the caliber to remain so restricted, and their work became more nearly parallel and ultimately the forces combined and fused in one commercial organization.

Captain Noble served as secretary of the Committee on Rifled Cannon when he was an officer of artillery. In 1859 he was also a member of a committee which studied the relative strength of guns and armor plate, and there were also added to the responsibilities of the same crowded year his duties as an assistant inspector of artillery. He was also a member of the Ordnance Select Committee and a member of the Committee on explosives.

Joining Forces with Armstrong

So energetic a personality could not help being well known and appreciated. It was therefore quite in the course of events that he should be invited in 1860 to join his forces with those at the Elswick plant in the north of England. The Elswick Works date back to 1846 and were founded by William G. Armstrong. From the purchase of a small piece of land, five and a half acres, in 1847 the site has steadily grown to an acreage of 250. Five years ago high water mark was reached with a payroll of £36,802 per week, but with the present contracts in hand it is believed that the palmy days will be renewed and that former prosperity may perhaps, indeed, be speedily surpassed.

Captain Noble in his long association with Lord Armstrong and with Professor Abel, made scientific inquiry into the allied subjects of rifling, explosives and projectiles. He was elected a Fellow of the Royal Society in 1870 and was awarded the royal medal in 1880. When the British Association met at Leeds in 1890 Sir Andrew Noble was president of the mechanical science section. He has published many essays and has frequently lectured on the subjects in which he has acquired a considerable degree of fame. The Durham College of Science conferred the degree of D. C. L. on him in 1897. He was created a C. B. in 1881 and a K. C. B. in 1893 and has been decorated with the orders of Italy, Portugal, Spain and Brazil.

Sir Andrew Noble became chairman of Sir W. G. Armstrong, Whitworth & Co., Ltd., as successor to the late Lord Armstrong in 1901, but for 20 years before that event the active direction of the company's affairs was almost entirely in the hands of Sir Andrew. The extent of the business in all its ramifications is surprising. Mitchell's shipyard at Walker was linked to the Elswick plant in 1882, and properly supplemented the ordnance division in its naval gun construction and installation. Originally a general engineering or tool plant the pioneer shop at Elswick received a renewed impetus along its first path, when in 1897 the combination was effected with Whitworth's famous works at Openshaw. Latterly these shops at Manchester have done much to improve and popularize high speed steel practice, and the literature of the subject has had notable additions made to it by A. H. Gledhill and Walter Carter. Elswick's history begins with engine building; then came the ordnance department, next a steel plant, then the Walker shipyard, the shipyard at Elswick, the Pozzuoli Works in Italy, the Openshaw plant at Manchester, and the Scotswood Works at Newcastle-on-Tyne. Armstrong, Whitworth & Co. build war vessels, ordnance, armor plate and projectiles, as well as many of the important auxiliaries to the manufacture of these imposing products, such as high speed steel and machine tools.

Machines That Have Made History

Built up in the way these respective plants have come to their present proportions, they are instructive reminders of the personalities that have made themselves and them famous. The present writer entered the office at the Openshaw Works, a few years ago, was most hospitably received, and given an opportunity to sign his name in the register with a quill pen. He was further permitted to watch the operation of rolling armor plate and to see various engineering practices that in most countries are not commonly exhibited to foreigners and sometimes not to natives. A Porter-Allen engine of the early sixties was smoothly and silently driving the shafting of one of the shops. It was reminiscent of the time when Whitworth and Porter agreed to disagree. The full account will be found in the recollections published by the latter party to the pact. That the engine should have so long survived the years of experiment, when American design was grafted upon English methods of production, was not at all surprising to the guide who expected the fit to survive and to keep at it. In the tool room he pointed out a lathe having the date of 1849, and pronounced it the best there was around, an opinion in which he was loyally supported by the foreman.

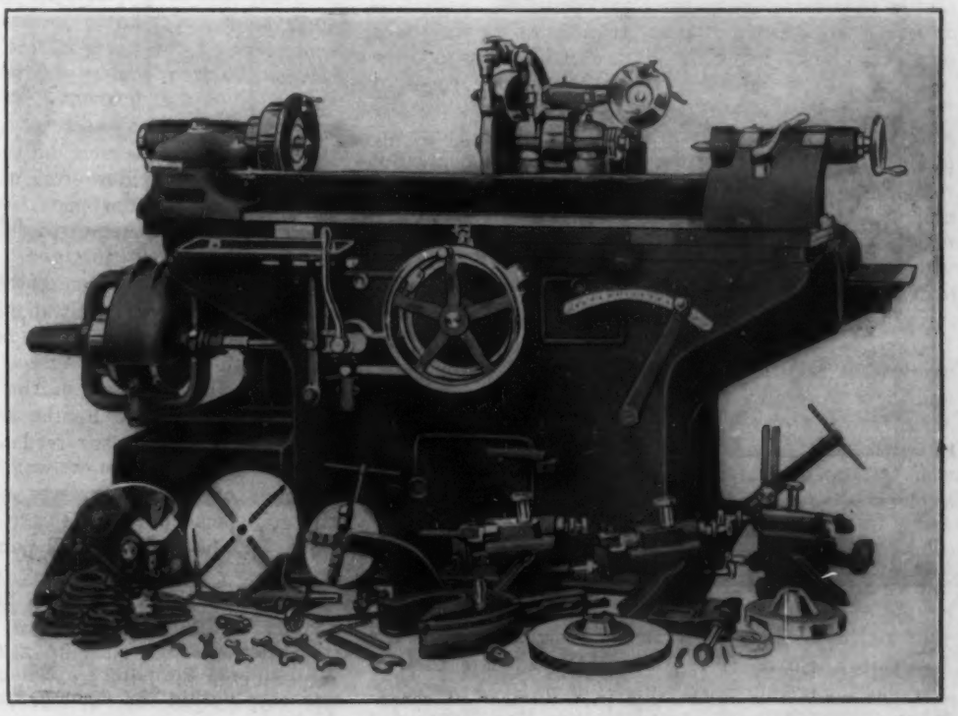
It was in just such an atmosphere that the early experiments on true screws were brought to a high pitch of success, and it was with the self-same devotion and confidence that similar researches were prosecuted upon such diverse subjects as the compressing of fluid steel, the flattening of the trajectory of a musket ball, the settlement of the proportions of the projectile and of the rifling, the production of accurate surface plates, the manufacture of measuring tools of a high degree of precision, and the making of hollow shafts for propellers. The allied plants are alike of the greatest engineering interest, and they have filled so large a place in the industrial world that the approaching celebration of Sir Andrew Noble's jubilee year should strike a responsive chord of far-reaching goodwill. For a further reason will 1910 be notable at Elswick and at the sister plants, since it also happens that 100 years ago, on November 26, 1810, there was born at Pleasant Row, Shieldfield, Newcastle, he that was afterward Lord Armstrong.

The S. Keighley Metal Ceiling & Mfg. Company, Pittsburgh, whose plant is at Follansbee, W. Va., recently secured a contract for 700 Phœnix metal lockers to be installed in a school at Richmond, Ind., and 400 for a Washington, Pa., school. Other contracts for Keighley lock joint metal ceilings keep the manufacturing departments operating to good capacity.

Landis No. 3 Universal Grinding Machine

At the convention of the Master Mechanics' and Master Car Builders' Associations recently held at Atlantic City, the Landis Tool Company, Waynesboro, Pa., exhibited two grinding machines which were especially adapted for railroad work. One of these, a 16 x 72 in. plain self-contained grinding machine with gap, was illustrated and described in *The Iron Age* April 21, 1910, and the other is the No. 3 universal grinding machine, which is illustrated herewith. This machine embodies many new features and improvements which it is stated enable it to produce accurately and highly finished work rapidly and economically. It combines both an external and an internal grinder and is especially adapted for tool room service for finishing such work as straight and taper spindles, arbors, rolls, gauges, dies, reamers, milling cutters and a large variety of other work that can be held by either a face plate or chuck. To change the machine from an external to an internal grinder, it is simply necessary to swivel the wheel head end for end and replace the wheel guard and wheel with the internal fixture and driving pulley respectively.

The table swivels for grinding tapers, and has two scales graduated in degrees and inches per foot. The maximum number of degrees for which a taper can be ground is nine and the greatest taper is 4 in. per foot. The headstock is made to swivel for short abrupt tapers, the setting of which is indicated by graduations on its base. The outer of the two pulleys shown is for driving the work on dead centers, while the inner, which is cupped to allow the greatest possible length of bearing, is for driving the spindle. The spindle is of large diameter made of high grade steel hardened and ground to size, and runs in phosphor bronze bearings which are adjustable for wear. The tailstock spindle is operated by a hand wheel and is provided with a variable tension spring or it may be held rigidly for supporting the center to the work.



The No. 3 Universal Grinder, Made by the Landis Tool Company, Waynesboro, Pa.

The construction of the grinding wheel head is very rigid and the slider has long guides with large bearing surfaces. It is so arranged as to take up any back lash that might occur in the feed gearing automatically, thus preventing any possible jumping in of the wheel when feeding. A micrometer lateral feed is provided for the spindle, which is useful in grinding shoulders and similar work, such as the sides of disks, points of snap gauges and other pieces which must be ground to an exact size with the sides of the wheel. The entire grinding wheel head swivels on the carriage for taper grinding and is graduated through arcs of 90 degrees on each side of the center line. The wheel can be fed to the work either automatically or by hand, through the hand wheel at the right of the head. The grinding wheel travel is automatic and is controlled by dogs which are positively set. The dogs drive against the sliding bar in the reversing lever which can be released, thus permitting the wheel to be moved beyond the reversing point in either direction and return and reverse as before without disturbing the setting. The dogs are set by lifting the adjusting screws out of engagement with the circular rack on which they are mounted and sliding them to the approximate position required. A fine screw adjustment is used when setting them to shoulders. The lever at the left of the hand wheel on the front of the base is for reversing by hand and the slide lever near its upper end between it and the hand wheel is for starting and stopping the power traverse. Grouping these two levers and the hand wheel so close together is a very simple and convenient arrangement, as all the operating levers, handles and adjustments are within easy reach of the operator from the front of the machine and the grinding wheel is always in plain view of the operator when making any speed change or adjustment. The wheel carriage tarries automatically at the reversing points, thus permitting the wheel to clear itself at shoulders before reversing, and if desired this time of tarrying can be varied. The automatic cross feed operates at each reversal of the carriage and can be adjusted to reduce the diameter of the work each time the carriage reverses from 0.00025 to 0.005 in. The feed is regulated by a thumb latch, the pressing of which sets it for the required size and the feed will size work accurately to within 0.00025 in. and stop automatically when the work is finished to the size at which the mechanism is set. The speed of the grinding wheel traverse is controlled by the lever moving over the quadrant at the right of the machine.

The rests support the work at two points, underneath and in front, each support being adjusted independently of the other, which it is said is essential to perfect grinding. Another advantage of these rests is their compactness and narrowness, which is desirable when grinding between the shoulders of cranks and similar work.

The following table gives the principal dimensions and specifications of the machine:

Diameter of headstock spindle, inches	2⅝
Diameter of tailstock spindle, inches	2½
Diameter of work carrying centers, inches	1⅛
Width of work driving belt, inches	2
Number of speeds	12
Diameter of grinding wheel spindle, inches	1¼
Diameter of grinding wheel driving pulley, inches	5½
Width of grinding wheel driving belt, inches	2½
Diameter of grinding wheels, inches	12 and 14
Face of grinding wheels, inches	1 and 1¼
Diameter of countershaft pulleys, inches	11
Speed of countershaft, revolutions per minute	475
Width of countershaft driving belt, inches	4
Power required, horsepower	5
Floor space required, feet and inches	4 x 9 6
Net weight of machine, pounds	5,800

The accessories regularly furnished with this ma-

chine include two grinding wheels and centers, a grinding wheel truing device, a No. 4 internal grinding fixture, a 7½-in. four-jaw independent chuck, face plate, center rest, stationary back rests, traveling and stationary cutter rests, cutter chuck, pump and tank for supplying water to the work being ground, a set of dogs and a set of wrenches.

A Model Machinery Warehouse

The Jersey City Warehouse of Manning, Maxwell & Moore, Inc.

The accessibility of Jersey City to New York, since the completion of the Hudson tunnels, has prompted a number of large firms in the iron, steel and machinery business to establish warehouses in Jersey City for the purpose of storing and displaying goods. The crowded conditions in the New York machinery district has made this imperative in a number of cases. The latest structure of the kind to be built in Jersey City has just been completed at 446-452 Communipaw avenue for Manning, Maxwell & Moore, Inc., whose general offices are at 85-89 Liberty street, New York. Besides being a storage and distributing branch of the company's business, a section of the building is used for the purpose of displaying machinery in motion to demonstrate the working parts of intricate machinery to prospective purchasers.

The new warehouse is a model of its kind, particular attention having been paid to the question of handling heavy machinery which, under the most favorable circumstances, is a difficult matter. The building is a one and two story structure, 100 x 200 ft., and contains 27,000 sq. ft. of floor space. It is practically fireproof, the only wood in the building being that used in making the bins for the storage of mill supplies, &c.

How Heavy Machinery Is Handled

The arrangement of the main floor is given in the accompanying plan, Fig. 1, while Fig. 2 is a cross section showing the hight and other features of the structure. There is an open space on all sides of the building so that it is admirably lighted by an abundance of windows. The only excavation made under the building was to provide sufficient space for the elevator machinery and the boiler, which are reached by spiral stairs. The first floor, which is laid in concrete, was placed at a hight above the street level, sufficient to allow the loading and unloading of drays and freight cars. This floor is divided into two equal parts by a partition with openings from the store on the right to the storage department on the left. There is an office 23 x 32 ft. in size, around three sides of which is a mezzanine gallery reached by spiral stairs. This gallery is used for filing cases.

At the front of the building are four canopy doors, which mechanically fold up and give access to four runways or pits for electric trucks, extending into the front of the building. When trucks are backed inside, their floors are flush with the first floor of the building. At night the trucks are kept in the pits. A spur from the Central Railroad of New Jersey enters the building, and there are accommodations on it for two cars within the structure.

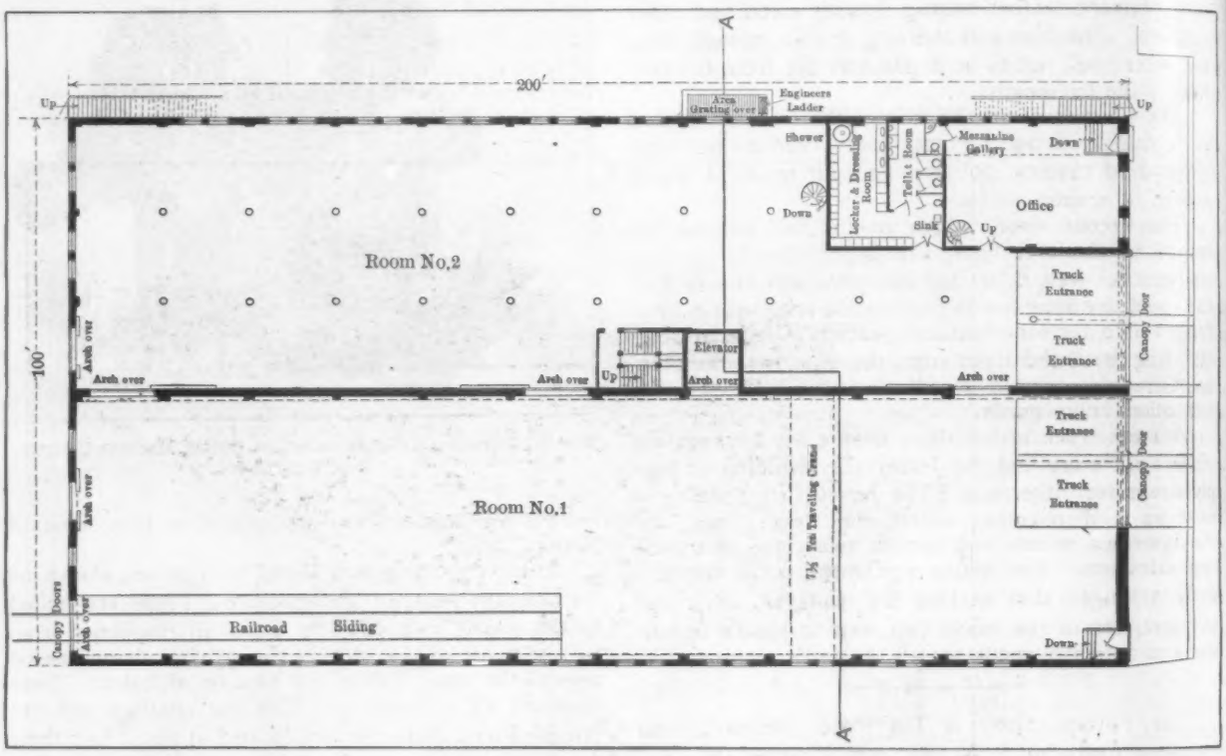


Fig. 1.—Ground Plan of Manning, Maxwell & Moore's Jersey City Warehouse.

This section is used for receiving, storing and shipping loaded machinery, and is served by a 7½-ton standard Shaw electric traveling crane with a 46-ft. 8-in. span on a 200-ft. runway. A crane of this capacity is sufficient to handle all machines usually carried in stock, as anything in the line of mechanical equipment heavier than that weight is generally made to order and delivered from the works.

Near the center of the structure is a hydraulic elevator of 5000 lb. capacity for the purpose of con-

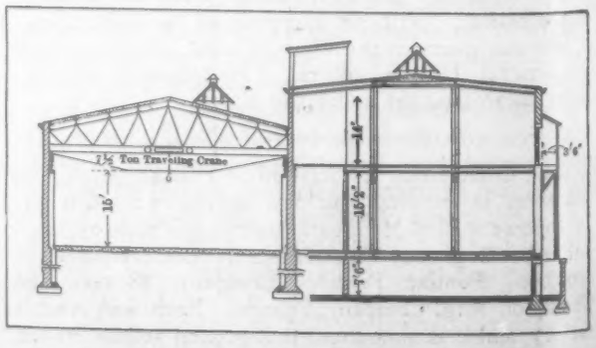


Fig. 2.—Cross Section at A A.

veying heavy machinery to the second story. Any piece of machinery of a weight up to the capacity of the crane can be handled by two men and placed anywhere in the warehouse. The warehouse section of the building is only one story in hight, and besides having windows in the side walls is lighted by a number of skylights. A door opens from the side of the office into the store.

How Lighter Stock Is Handled

About 5 ft. back of the electric truck pits is a city counter 15 ft. long. This is closed at the front, while at the back are bins for small goods, which have been ordered and are awaiting delivery. The counter is cut through at one part of it, and hinged at the back and supported on castors. The hinged part is opened to permit loaded warehouse trucks to be run directly on or off of any one of the electric trucks. In the rear of the counter are bins and shelving for the storage of goods. On this floor are kept drills, files, cutters, reamers, leather belting, babbitt metal and other supplies. The bins and shelving are far enough from the outer wall, not to be exposed to fire from the outside of the building.

The floor space in the rear of the elevator is used as a display room for machinery, which has been stripped of crating, polished and put up as it would appear in a shop.

The second floor, which covers half of the full length of the first floor, can be reached by a slate staircase as well as by the elevator. On one side of the room are bins for D-handled shovels, with a platform above for long handled goods, the latter not interfering with the light from the windows. On this floor are also carried wheelbarrows, forges, oil tanks and other bulky goods.

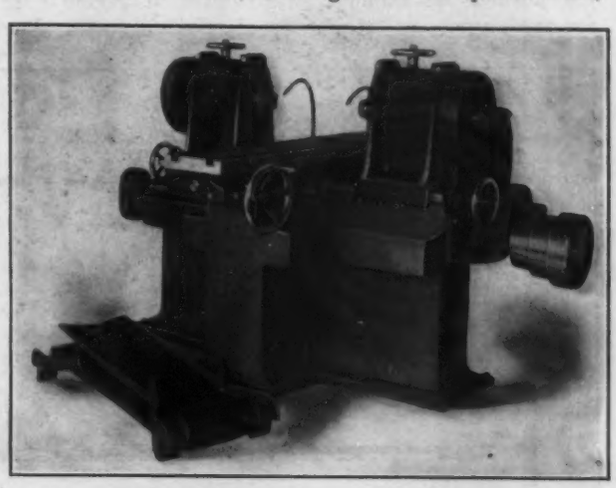
A ½-ton truck makes three trips a day between the New York store and the Jersey City building to supply needs for either one. The Jersey City building is used as a distributing center for New Jersey and Pennsylvania points, and has its own corps of traveling salesmen. The entire equipment is so conveniently arranged that besides the manager, clerk and stenographer in the office, two men to handle incoming and outgoing goods are all the force required.

The Phillips Sheet & Tin Plate Company, with plants at Clarksburg, W. Va., and Weirton, W. Va., is operating both to full capacity. The Weirton plant is the newer of the two, being a 10-mill plant. It is here that 10 new sheet and tin mills are to be added. The buildings have been erected and ground is being broken for the foundations for the machinery, which will be installed and ready for operation about October 1. The Nicola Building Company, Pittsburgh, has under construction 100 new workmen's houses that will be ready for occupancy about September 15, making 200 houses in all. When running to capacity the Weirton plant will employ 1500 men. Additions are being made to the water works system to care for the new mills and for furnishing water to the workmen until a town water system is installed. A sewage plant is under construction and gas and electric lights are available in the houses. With the exception of the mill engines, all the machinery in the Weirton plant will be operated by General Electric motors. The company manufactures sheets and tin and terne plates.

The Commercial Association of Pontiac, Mich., has succeeded in securing four new industries for that city as follows: The Michigan Stamping Company, capitalized at $150,000; Vulcan Gear Works, capitalized at $100,000; Pontiac Foundry Company, $80,000, and Champion Mfg. Company, $50,000. Each will erect a factory, and it is announced that ground will be broken this month.

The Garvin No. 3 Duplex Milling Machine

The Garvin Machine Company, Spring and Varick streets, New York City, has recently brought out the new model duplex milling machine illustrated herewith, which is known as the maker's No. 3 duplex milling machine. In the design of this machine the object sought was to obtain a feed of 60 in. without any cramping or deflection of the slide and to take care of the drippings and chips from the cuts. The slide table is 64 in. long, and the saddle bearing supporting it is 4 in. shorter. The feed to the table is by a spiral rack cut out of the solid on the under side of the slide, which meshes with a large diameter square thread steel worm, which is made in two parts so that wear can be easily compensated for. The slide shown in the illustration is made with grooves for special work,



The No. 3 Duplex Miller Made by the Garvin Machine Company, New York City.

but the regular pattern is provided with three standard T-slots.

In the engraving tool shield castings are shown on the floor in front of the machine. These are bolted to the saddle and serve to drain all drippings from the overhang of the slide to the oil chip channels cast around the upper end of the base on all sides. These channels all communicate with one another, and are provided with chip strainers located at about half their depth, thus leaving a clear oil space all around. The pump draws its supply through a fine strainer and delivers it to the work through a number of flexible pipes provided for the purpose.

The spindles are driven from a common splined shaft through spur gearing from a three-step cone pulley, which in its turn takes power from an overhead countershaft. Back gears having a ratio of 6 to 1 are also provided. The hole in the spindle conforms to the No. 11 Brown & Sharpe taper, and has a positive slot drive. A draw rod reaching through from the rear end of the spindle holds the taper shanks in their seats. The thread on the outside of the spindle which is 3¼ in. in diameter is cut according to the Brown & Sharpe standard 3½-in. pitch, and is furnished either right or left hand as may be desired.

The principal specifications and dimensions of the miller are as follows:

Width of working surface of table, inches	12
Length of working surface of table, inches	64
Maximum distance between spindles, inches	27
Minimum distance between spindles, inches	4½
Minimum distance between spindle and table, inches	1¼
Maximum distance between spindle and table, inches	9
Speed changes	3
Positive feed changes	12
Domestic shipping weight, pounds	5,480

The customary accessories, such as cutters, feed change gears and tools, are regularly furnished as a part of the equipment of the machine.

A New Case Crane Trolley

One Especially Adapted to Steel Mill Service

The latest trolley for mill service cranes designed and built by the Case Crane Company, Columbus, Ohio, is shown in the accompanying Fig. 1. This machine is built to meet the most severe requirements, and high claims are made for it from the standpoint of efficiency, accessibility, facility of repairs, workmanship and design. By referring to Fig. 2 it will be seen that the frame consists of two heavy iron castings connected by a very wide and heavy steel girt or separator. The slides are of box section, insuring a rigid connection with the girt. The efficiency of the machine as a whole depends very largely upon the trolley frame, and this one is made rigid enough to withstand the heavy shocks and severe strains that it may be called upon to sustain in this class of service.

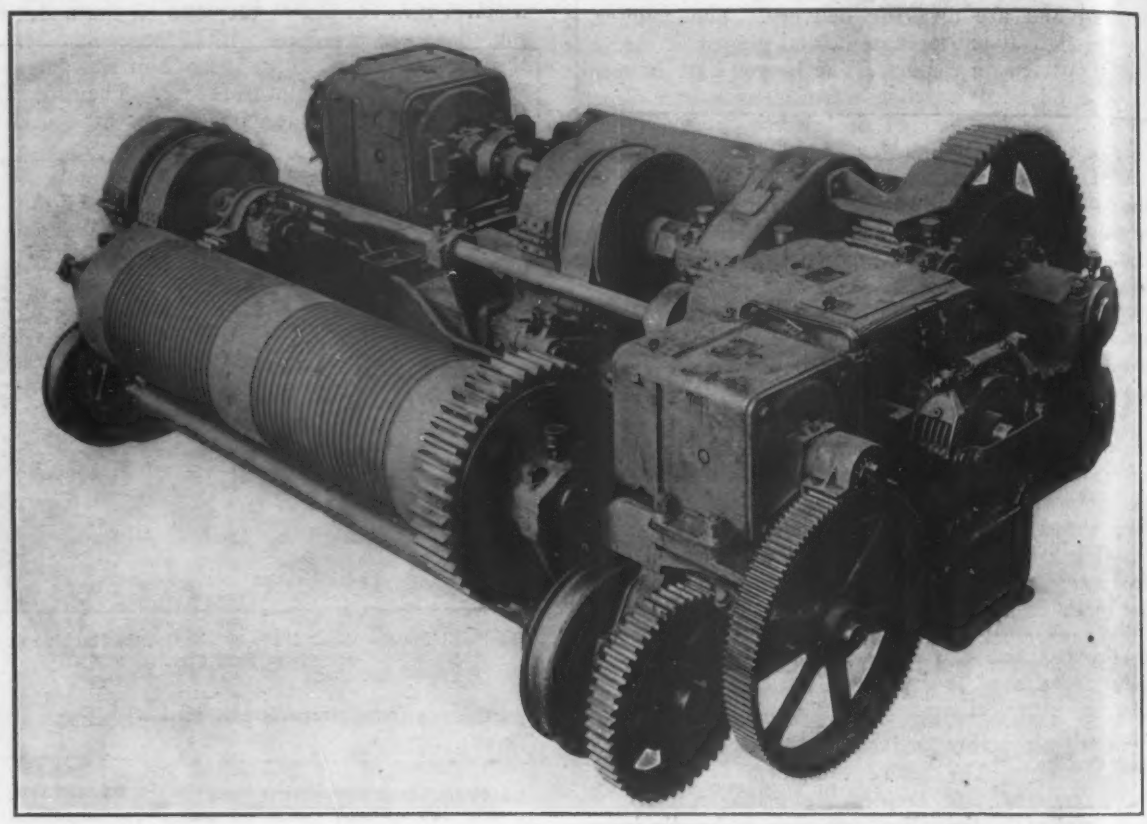


Fig. 1.—The Improved Mill Service Crane Trolley Built by the Case Crane Company, Columbus, Ohio.

To facilitate repairs, when such may become necessary, and to insure after they have been made that every part of the machine is in perfect alignment, all fastenings throughout are made by through bolts with United States standard nuts, and all bearings are provided with caps and fitted in split bronze bushings, eliminating the necessity of pressed fit bushings. All gears are of cast steel and pinions of forged steel cut from solid stock. There are no overhung gears in the hoisting mechanism, and all gears except the drum gear are inclosed by cases having inspection lids, as will be noticed from Fig. 1. The entire upper half of the gear case is hinged, allowing free inspection without removing the bearing caps, these being independent of the lids as is shown in the illustration.

The truck wheels are either of cast iron with chilled tread, cast steel, or manganese steel, all ground to size. They are keyed to axles revolving in M. C. B. type bearings, which allow removing the wheels with their axles by simply relieving them of the load. All shafts with their gears and pinions can be lifted out without disturbing any part of the machine by simply removing caps. All shafts are of 0.40 to 0.50 per cent. carbon steel, ground to size, with shoulders. The drum gears are keyed on the drum, which is removable in the same manner as the shafts, and the hoisting motors can also be removed without disturbing the motor armature or electric brake, which are mounted directly on the trolley sides.

The load retaining brake is a modification of the Weston type, and is either provided with friction material or wood or bronze and cast iron disks for holding the ratchet wheel in the lowering direction. The differential flexible band has been adopted instead of the ordinary pawl and ratchet; the band releases automatically when hoisting, and speedily grips the brake wheel when lowering. The advantage of this type of brake is that it applies itself without undue shock, prevents the locking of the brake, and the operation is smooth and noiseless. For cranes of large capacity a combination band wheel with pawl and ratchet extension has been adopted, as shown in Fig. 4. This ratchet wheel is in the nature of an extra safety device, since the rupture of the strap may cause the load to drop, although such an occurrence is hardly possible, as the strap is designed with a very large factor of safety. However, should the band fail to engage through breakage, the pawl and ratchet arrangement

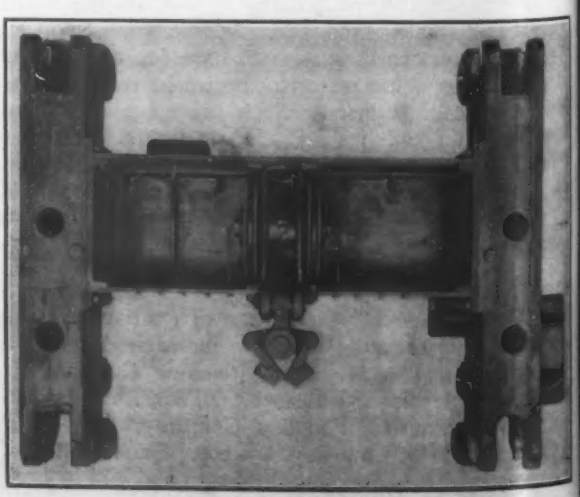


Fig. 2.—A Bottom View of the Trolley Frame.

provides the hoisting mechanism with a holding device until such a time as the necessary repairs can be made. This arrangement has the advantage that the machine cannot be put out of commission, which is very important in steel mill service.

The motor brake drum is coupled to the armature

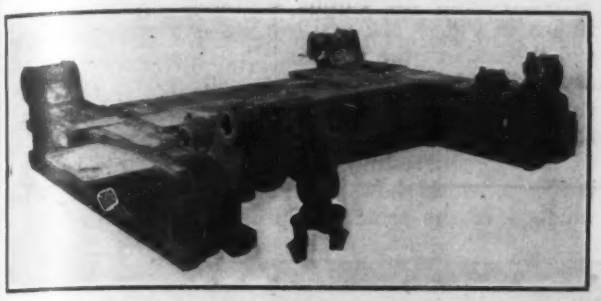


Fig. 3.—A Normal View of the Stripped Trolley Frame.

shaft of the hoist motor, as shown in Fig. 1, and the solenoid frame is bolted to the trolley side. The brake is of the shoe type, combining the advantages of the self-contained motor brake, no end thrust on the armature shaft, perfect accessibility and ease of adjustment and repair. The brake is ample in proportion, constant in action, its retarding torque is uniform and brings the armature quickly to rest without shocks or blows, and is powerful enough to insure accurate stopping.

The limit switch comprises a traveling nut and screw, with a positive guide, usually attached to the drum shaft, and when the hook has reached the upper limit the contact is formed which throws a circuit breaker located in the crane bridge cage upon the switchboard.

Nearly all gears and operating parts are contained within the trolley sides, so that the weight is very equally distributed, which prolongs the life and insures uniform wear of the parts as far as possible. Such parts as are likely to require renewing are readily accessible, and replacements can be made with little time and labor.

R. W. Valls, the new chief engineer of the Case

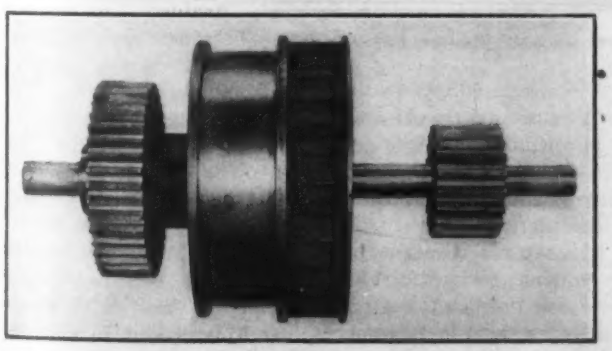


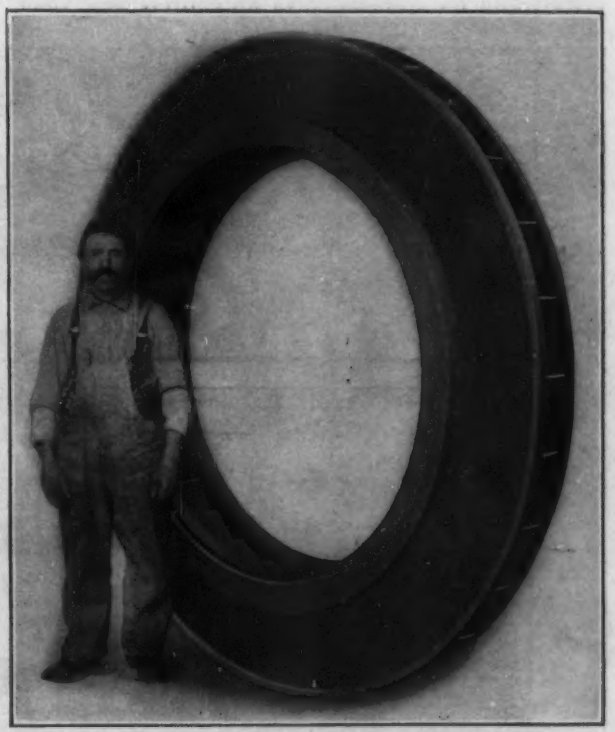
Fig. 4.—A Combination Band Wheel with Pawl and Ratchet Extension Used on Large Capacity Crane Hoists.

Crane Company, is the designer of the new features which have been embodied in this trolley.

That steam plant owners are realizing more and more the necessity of clean boilers is evidenced by the number of orders placed with the Wm. B. Scaife & Sons Company, Pittsburgh, Pa., manufacturer of the Scaife and We-Fu-Go water softening and purifying systems, not only for steam boiler feed use, but for other industrial uses. Some recent We-Fu-Go orders received are as follows: Carnegie Coal Company, Oakdale, Pa., 750 hp.; Twin State Gas & Electric Company, Dover, N. H., 575 hp.; American Sheet & Tin Plate Company, Gas City, Ind., 1800 hp.; Wickwire Steel Company, Buffalo, N. Y., 3000 hp. addition to present 6000 hp.; Cleveland Hardware Company, Cleveland, Ohio, 1000 hp.; Pocahontas Consolidated Collieries Company, Switchback, W. Va., 5000 hp.

A Large Manganese Bronze Water Wheel Runner

One of the largest pieces of manganese bronze ever cast was recently shipped by the Whitlock Coil Pipe Company, Hartford, Conn., to California for the Pelton Water Wheel Company, Philadelphia, Pa. Some idea of the enormous size of the casting can be obtained from the engraving, which shows the diameter of the piece in comparison with the hight of an ordinary man. When the casting reaches the Pacific Coast it will form the runner for a large water wheel which the Pelton Company is installing there.



A 2800-Lb. Manganese Bronze Water Wheel Runner, Cast by the Whitlock Coil Pipe Company, Hartford, Conn.

The weight of the casting is 2814 lb., the internal and external diameters are approximately 5½ and 8 ft., respectively.

Joseph T. Ryerson & Son, Chicago, announce the removal of their New York office to the seventh floor of the Hudson Terminal Building, 30 Church street, New York City, and the maintenance in connection therewith of machinery display rooms and warehouses immediately adjacent to the Jersey City terminal of the Hudson and Manhattan tunnel. In addition to a complete stock of boiler, structural and machine shop specialties and fittings, Morison corrugated furnaces, Glyco bearing metal, tool steel, metal working shop supplies and equipment, including both hand and power tools, their increased facilities will permit of immediate shipment from stock of staple lines of iron and steel, including structural shapes, universal plates, &c. In keeping with the establishment of Eastern warehousing facilities and machinery display and demonstration rooms, the personnel of the New York office will be increased sufficiently to insure the most careful attention to the firm's Eastern trade.

The Whitaker-Glessner Company, Wheeling, W. Va., has sent out specifications asking for bids on its new steel plant to be built near Yorkville, Ohio, across the river from Wheeling. The initial plant will consist of three 60-ton or 75-ton open hearth furnaces. The company is selling treasury stock to defray the cost of the new plant.

Feats with the Oxy-Acetylene Torch

Difficult Cutting Jobs for Which It Is Peculiarly Adapted

An extremely difficult undertaking in the way of cutting was successfully accomplished recently with the oxy-acetylene torch by the Autogenous Welding Equipment Company, Springfield, Mass. The Springfield Five-Cent Savings Bank has a vault which was built in 1875, and during the course of remodeling the bank it was necessary to put a new vestibule and door in this vault because the old one was too narrow. This, together with the installation of an entirely new vault, was undertaken by the Diebold Safe & Lock Company, Boston, Mass., under the personal direction of George A. Getschell.

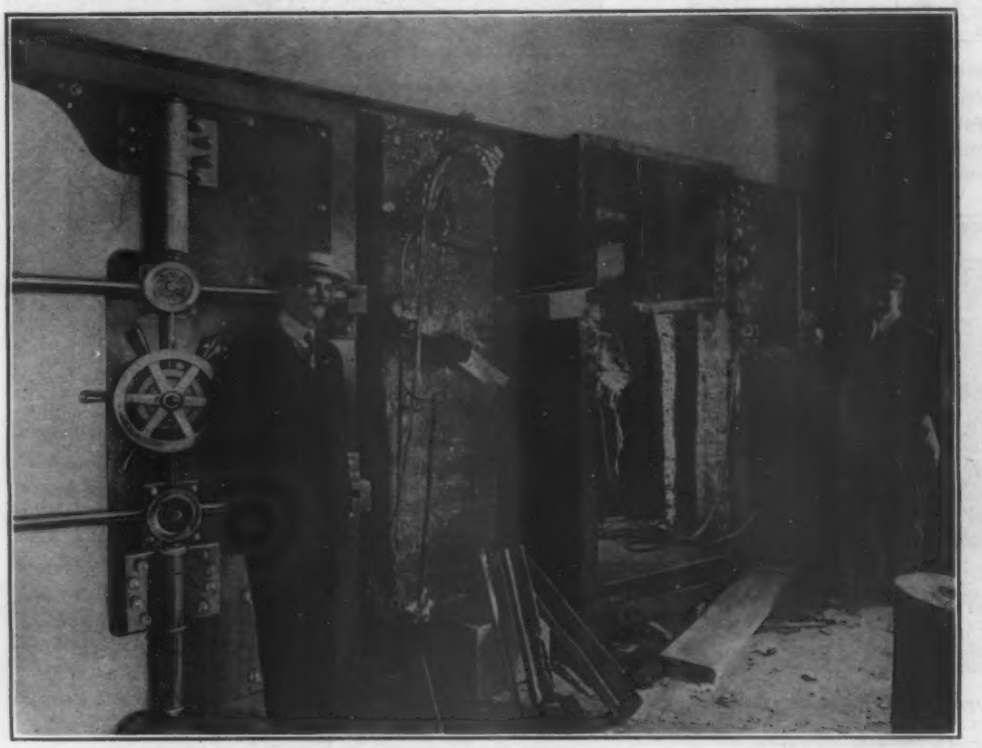


Fig. 1.—A Bank Vault of Steel Rails and Chrome Steel Bars Imbedded in Cement, Cut with the Oxy-Acetylene Torch.

The old vault was armored with 60-lb. railroad rails, which were purchased from the Boston & Albany Railroad at the time the safe was built. These were bent so as to follow the ground work of the vault, including the vestibule, and were built so that they dove-tailed into each other, the rails being set in a very strong cement. The roof of the vault was built up in a similar manner. It was necessary to make a cut on each side of the vestibule and across the top and bottom; the total cutting was about 30 ft. and the thickness of the wall 5¼ in. This would not have been very difficult to remove in the ordinary manner by drills and hack saws if it had not been that the makers of the safe had laid a bar of three-ply chrome steel between each rail, a material which it is impossible to saw or drill. The necessary cutting was done, however, with the Davis-Bournonville positive mixture oxy-acetylene cutting torch.

The presence of cement between the rails complicated the work, as it was necessary to knock it away from between each rail as the cutting progressed. The laminated chrome steel did not offer any difficulties with this method of cutting. It would, however, have been a very much simpler matter to cut the same amount of solid steel compared with the cutting of this built up material, owing to the fact that a very slight film of cement over the surfaces of the metal interferes seriously with the cutting operation. The vault is shown in Fig. 1, the vestibule being partly cut away, and the ends of the rails and the chrome bars can be distinguished on the right vestibule wall. The new vault door is to the left and sections of the rails that have been cut are seen on the floor between the doors.

Another interesting example of cutting can be seen in Fig. 2, which shows an exhibit placed in one of the windows of the principal Springfield drug store during the recent Springfield Products Week when all the local manufacturers exhibited their products in the windows of the tradesmen through an arrangement made by the Springfield Board of Trade. This enabled the residents and the large number of visitors who came to the city during the week to realize the importance of the city's industries, and is a plan that could be advantageously adopted in other cities. The Autogenous Welding Equipment Company took this occasion to exhibit its welding which, though not a product, was termed "Springfield Skill and Brains." A demonstrator was seen at work in the window surrounded by samples of various classes of work, together with a Davis-Bournonville high pressure acetylene generator and other parts of the equipment. The exhibit illustrated was the name of the company cut in a 5-16-in. steel plate, 7 ft. long and 10 in. wide by its president, Henry Cave, with a jet of oxygen from one of the cutting torches. The ⅜-in. round steel was then welded around the plate to form a bead, giving the sign a neat appearance. The time taken to cut the name was approximately 45 minutes. Mechanics will realize the difficulty of cutting this sign in any other way, and can readily see the usefulness of the cutting process for roughing out trimmer plates for drop forgings and dies of a similar nature for other purposes, as well as the large amount of other work, such as trimming boiler flanges, and also, owing to the portability of the equipment, for cutting structural iron work in the field.

Fig. 2.—A Name Cut in a 5-16-In. Plate, 7 Ft. Long and 10 In. Wide, with a Cutting Torch.

The company makes a specialty of repairing large

breakdowns in power plants and other machinery, having an equipment on hand for immediate shipment to repair a breakdown with the least possible delay. Not only is the work carried out at a less cost than replacements, but there is a tremendous saving in time and the reduction in the time of a shutdown is often of the greatest importance. The company also does a large amount of manufacturing and repair work at its plant at 41 Bay street. It has made a specialty of repairing street railway motor frames, and has had some of them in use for several years after being repaired, none of which have been known to break again in the same place. The cost of repairing in this manner is very moderate.

Handling Small Articles Economically

The plant of the National Cash Register Company, Dayton, Ohio, has a reputation throughout the world of representing the latest development in both factory construction and equipment. The latter was especially designed to meet the demands of this particular shop,

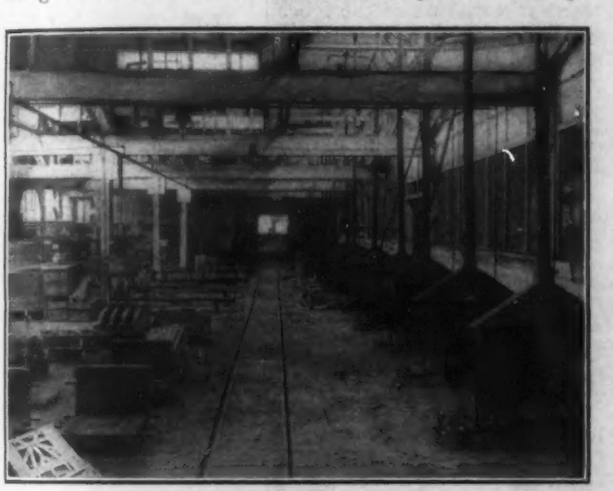


Fig. 1.—Interior of the Foundry of the National Cash Register Company, Equipped with Industrial Railways, Built by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa.

which require the rapid movement of the hundreds of small parts which enter into the construction of a cash register by the engineers of the Orenstein-Arthur Koppel Company, Pittsburgh, Pa. What they have done to promote plant efficiency along these lines is shown by the three half-tone engravings which are reproductions of photographs taken in the foundry of the plant.

This building covers 157,500 sq. ft., and every portion of this large area is thoroughly served by industrial railway lines. All the raw material that enters

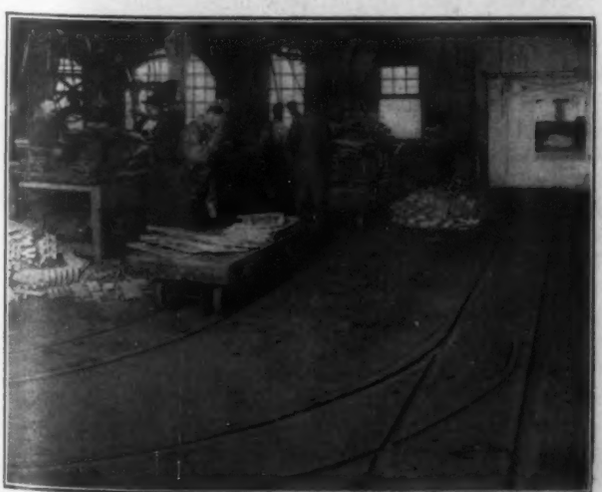


Fig. 2.—Handling Small Brass Castings on Industrial Railway Cars.

Fig. 3.—View of the Track, Turntable and Siding.

into the manufacture of brass castings and the finished castings themselves are handled on the railway, the system being arranged so that no other trucking is necessary. All metals are stored in a weighing-out room and are distributed from there to the different furnaces. A like routine is observed with regard to the molding sand, which is prepared at a central location and served out to various points in the foundry requiring it.

The output of the foundry is about 25,000 lb. of brass castings per day, most of which are very small and must be handled several times. This large output, coupled with the fact that all of these parts are finely machined and must be handled with extreme care to prevent breakage or other forms of injury, will serve to give some idea of the amount of labor required to move this material. The monetary value of the saving in time and labor effected by the installation of this industrial railway system has never been determined exactly, but it is stated that three men are doing what it formerly required six men to do, and the work is being done with greater speed.

One of the novel features about this installation is that only one type of car, which is the ordinary flat platform model shown in Fig. 2, is required to perform all the transportation work about the plant, as it is capable of handling all the raw materials and the output of the foundry easily.

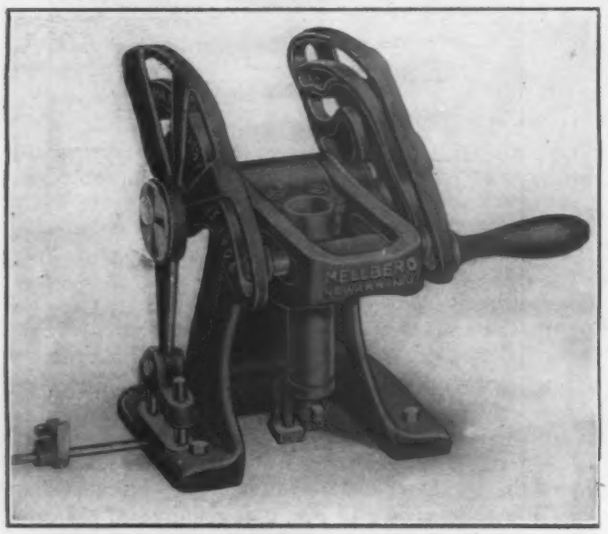
J-M Metallic Packing.—The H. W. Johns-Manville Company, Cleveland, Ohio, announces a new mechanical packing for which high claims are made for endurance, economy and efficiency. It is named the J-M metallic packing (Bulock patent). It is the outcome of years of careful study and investigation of all conditions and experiences met in the sale and use of mechanical packings. It is manufactured in Cleveland under the direct supervision of the company's own experts. While of segmental construction, when assembled on the rod it takes the form of a solid ring; that is, it is impossible for one segment to turn up on edge and score the rod. It is also a self-lubricating packing, being so constructed that small reservoirs are formed in the various rings which contain lubricating oil, thus insuring a constant, thorough and economical lubrication.

The use of hardness testing devices on rolled brass is referred to by the *Brass World*. Brass is rolled in many different "tempers." Usually when a sample of sheet brass is sent in so that an order to be filled may match it, bending or scratching is resorted to to determine its temper, the result often being only a guess. The hardness testing methods used with steel are beginning to be employed for brass, but the ability to determine the "temper" of a sample of brass is not yet well established.

The Mellberg Tube Closing Machine

A Novel Device for Mechanically Sealing Collapsible Metal Tubes Rapidly

The use of flexible metal tubes for pastes of various kinds, paints and medicinal preparations has become very common. The customary method of sealing the bottom of these tubes after they have been filled has been to turn over the bottom of the tube with a pair of pincers to form a seal. The Mellberg Machine Company, 473 Washington street, Newark, N. J., has recently placed on the market a patented machine for doing this class of work, for which the principal advantages claimed are a much more rapid rate of production and at the same time a much reduced cost, as the use of this machine does away with the use of hand labor, which in itself is not expensive where only a few are employed to seal the tubes, but runs to quite a large amount where the output is large and the number of girls employed great. Another feature of the machine is a printing attachment which labels the closed capsules, or if desired prints the advertising card of the



Patented Tube Closing Machine, Made by the Mellberg Machine Company, Newark, N. J.

maker across the folded end of the tubes. This printing or stamping of names or cards across the folded end possesses the further advantage of more closely sealing the capsule as the parts are pressed closer together and consequently more firmly united.

In the accompanying illustration the machine is shown in position to receive a capsule for closing, and it will be noticed that it consists of a frame provided with a flaring base flange and vertical side members and two forwardly projecting members connected at the front by an integral cross member. The back portion of the frame extends over at the upper part to form a hood and slotted cams are provided on either end of the shaft which passes through it. Horizontal guide slots are provided in the forwardly projecting members and a sliding plunger is mounted therein which fits into the large semicircular slots in the upper part of the slotted cam. Antifriction rollers are provided on the ends of this plunger for the purpose of reducing the friction between the plunger and the cam slot.

The folder consists of a cylindrical shaft so mounted to oscillate in the frame of the machine that its bearings are substantially in alignment with the horizontal slots in the projecting members of the frame. Crank arms are secured to either end of this shaft by set screws and have pins with antifriction rollers at the other end which take into the lower cam slot. This slot, which is shown more clearly at the right of the engraving, is irregular in contour, the front portion being substantially straight while the other part is curved backward and is an involute of the shaft in the hood at the back of the frame. A small shaft with a ratchet wheel having an even number of teeth is mounted between the side pieces of the frame behind the tube shown in front of the hood. This shaft is operated from the handle at the right of the machine through a spring pawl and the ratchet wheel.

A horizontal shaft is mounted in the lower portion of the frame and projecting upward therefrom is an arm which has a roller at its upper end engaging with a lobed cam having half as many lobes as there are teeth on the ratchet wheel referred to in the preceding paragraph. Two arms project forward from the sleeve of this horizontal shaft and a saddle having a seat and socket for receiving the capsule is suspended from their outer ends by adjustable pivots. This socket is the cylindrical tube shown in the illustration between the horizontal forwardly projecting members of the frame. When placed in position the socket has a tendency to fall backward so that the upper portion makes contact with one of the lobes of the lobed cam, but the socket and its saddle also tilt forward so that the inserted capsule may be removed by hand. Provision is made for varying the depth of the socket to provide for different sizes of collapsible tube by an adjustable seat. When this seat is properly adjusted the open end of the tube will project upward between the plunger and the anvil of the sealing device which are fastened to the under side of the hood.

The printing device is on the left side of the machine and is operated by the rotation of the shaft which actuates a crosshead containing a line of type through an eccentric and a connecting rod. The horizontal rod projecting from the base of the machine serves as a gauge to bring the folded end of the capsule under the type bar and an adjustable yoke is provided for different sized tubes.

The operation of the machine briefly is as follows: With the handle in the position shown, the filled tube is inserted bottom upward in the socket so that it projects between the plunger and the folder. Moving the handle causes the plunger to be forced backward, thus compressing the upper edge of the capsule and at the same time the folder is rotated through the action of the lower cam-slot and the cranks so as to fold the upper edge of the tube at right angles to its length and a further movement of the handle retracts the plunger and brings the folder into contact with the face of the anvil so that the upper edge is folded down against the capsule. The handle by this time has reached the limit of its travel and on the return stroke the capsule is raised slightly by the horizontal shaft and the levers and arm connected thereto until it is in position for the second fold. This is made in identically the same manner as the first one and when the handle is brought back to its initial position the socket, containing the tube, is tilted forward. The sealed capsule is removed and placed with the folded end resting upon the type bar. Repeating the folding operation for a second capsule forces the cross head down on the folded end of the first one and prints the desired inscription thereon. These two operations are repeated for each capsule. To secure the requisite pressure for printing upon the folded end, an adjusting screw is provided which limits the motion of the handle and stops the eccentric when the desired degree of compression is reached.

To prevent any interference between the folder as it is rotated to form the first fold and the front edge of the plunger, the two sections of the lower cam slot are joined in an ingenious manner. Between the straight and involute portions there is a short section which is concentric with the shaft in the hood. Thus the combination of the three portions of the slot pro-

duces a varying oscillating velocity of the folder so that for a portion of the stroke of the handle, when the plunger is in close proximity to the anvil, the folder remains stationary and all interference of the parts is avoided.

Rubber cushions are inserted in the upper cam slots to prevent any shock being sustained because of careless handling. Holes are provided in the base so that the machine can be fastened to any fixed support and thus rendered more stable.

The Wattles Stoking Register

An Apparatus Which Gives Photographically a 24-Hour Record of Smoke Density in Chimneys

The Wattles stoking register is designed to give a complete record, automatically obtained, of the density of smoke in a chimney during each minute of the 24 hours. The purpose is to procure an exact knowledge of the stoking of boilers, with the double motive of decreasing the coal consumption and of eliminating any smoke nuisance by compelling consistent scientific firing. The apparatus is manufactured by the Wattles Stoking Register Company, Butler Exchange, Providence, R. I. The invention is the result of the vigorous efforts of the municipal authorities of the city to abate the smoke nuisance in the business districts. The inventor, Cyra B. Wattles, is in charge of several power plants installed in large mercantile buildings. Being unable to maintain a visual watch upon his chimneys, he finally devised the apparatus.

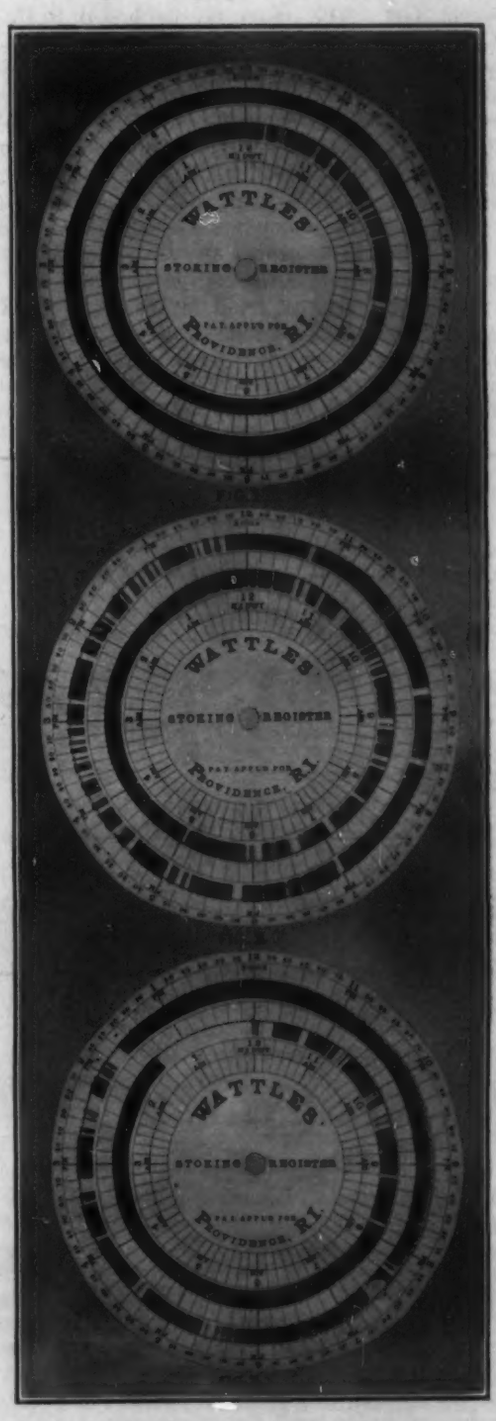
On one side of the interior of the boiler flue is an electric lamp. On the opposite side is a sensitized white paper dial fixed on the shaft of a clock. The dial covers a complete 24-hour day. The lamp and dial mechanism are each placed in a sheet iron cone at the end away from the flue, and far enough from it not to be in direct contact with the hot gases and not to become begrimed. Air holes around the lamp admit circulation to keep it cool and clean. All of the apparatus is readily accessible.

In front of the dial toward the inside of the chimney is a light tight plate or door with two slots; one slot is opposite the inner recording space, the other opposite the outer. Each operates for 12 hours. A tripping device in the clock mechanism serves to close the slot which admits the light during the first 12-hour period, and opens the slot for the second period, which in its turn is closed automatically at the end of 24 hours. The person in charge then removes the dial and replaces it with a clean sheet. Each dial, which is a disk of standard inexpensive photographic paper, is contained in a metal envelope so that no light can reach it excepting that which is admitted through the slots. The developing of the print completes a graphic record.

The rays of the electric lamps shine unobstructed through the slot in the recording mechanism when the chimney is clear of smoke, and a proportionately less pronounced photographic impression is made when the flue is obscured by the unconsumed gases of combustion. Therefore, the photographic record varies from white when smoke is passing in dark masses to black, which indicates a clear chimney. The chart reveals each time that coal is fed to the boiler. Unscientific stoking is seen at a glance.

In Fig. 1 it will be seen that the boiler was in very good hands most of the day. As the inner circle indicates between 9.30 a.m. and noon the work was less intelligently done. From 1 p.m. in the afternoon on through the night the chimney was consistently free from smoke. In Fig. 2 there are plentiful evidence of bad firing from 6 a.m. to 7 p.m.

A study of the dial readings soon determines the best period of time between stoking. The most economical use of fuel is established and the abolition of unnecessary smoke assured. The weaknessness of firemen may be remedied if the men have the usual intelligence. They can be taught the maxim of firing light and often. The moral effect in a boiler room must be great, for every employee knows that the office will be given a graphic and detailed account of



The Wattles Stoking Register.

his accomplishments. The owner may find out that a supposed need of larger boiler facilities is in reality the abuse of his existing installation. With poor stoking the larger unit may result in an increase rather than a decrease of the smoke nuisance and of his coal bill.

The inventor of the device works out the operation of his own power houses on the percentage basis, figuring the number of minutes where the smoke is dense and consequently obnoxious, by adding together the white markings of the day. The register is also of value in chimneys where automatic stokers are employed to feed the boiler fires, because it deter-

mines with accuracy the regulation of the mechanism to produce a maximum combustion. It serves a useful purpose in connection with the generating system. The time that the generator is shut down is shown by white spaces, one such being indicated in Fig. 3, covering the period between midnight and 1.30 a.m. Thus the person in charge receives exact information, which otherwise might not come to his attention. The device is so sensitive that it registers any variation in the voltage of a generator. Naturally the degree of voltage is reflected in the degree of light diffused by the lamp, and with a smokeless chimney the dial receives these delicate changes in intensity.

As used by Mr. Wattles the dials are changed at noon. The very black lines seen at the outer circle, Fig. 1, indicate the amount of back lash of the clock gearing, in taking up which the dial rests in one position for a brief time and the photographic paper receives a longer exposure. The stoking register has proved the source of material economy in the installation at Providence, as will be seen in the following statement:

Report of coal consumption and electric current for 1908-1909. Lauderdale Building, Providence, R. I. This plant has an equipment of three Babcock & Wilcox boilers of 125 hp. each; one 125-hp engine, driving one 100 kw. generator; two 85 hp. engines, driving two 40 kw. generators.

It is operated continuously, and also furnishes steam for the operation of seven hydraulic elevators, of which five are for passenger and two for freight service.

Average cost of coal for the years 1908 and 1909, $3.32 per ton.

Coal consumption, 1908	2,871.50 tons.	
Coal consumption, 1909	2,638.18 tons.	Saving.
	233.32 tons at $3.32 per ton.	$774.62
Removal of ashes, 1908	6,507 cans.	
Removal of ashes, 1909	5,509 cans.	
	998 cans at $0.05 per can	49.90
Electric current, 1908	281,503,882 watts.	
Electric current, 1909	289,715,584 watts.	
	8,211,762 watts increase for 1909.	
Estimated cost of producing increased electric current for 1909:		
	55 tons of coal at $3.32 per ton	182.60
Total saving for 1909		$1,007.12

The Wattles stoking register has been in operation on this plant during 1909, saving 10½ per cent.

In the first six months of 1910 the coal consumption has remained practically unchanged, as compared with last year. The tons of coal consumed were 1281.76, as against 1280.63 in 1909, while during this same period the plants have furnished 11,000,000 additional watts.

Customs Decisions

Circular Files

A protest filed with the Board of United States General Appraisers by Edward Starks & Co., raising the question of the classification under the new tariff of circular files of cast steel used in sugar beet machinery has been decided adversely to the importers. The files were returned for duty at the rate of 45 per cent. under the provision in the tariff for articles composed in chief value of metal. The importers set up the contention that the articles should be admitted at the specific rates provided in paragraph 155 for "files," according to length and value. The decision states that an examination of the sample, alone, and without some trade testimony showing that these machinery parts are in fact "files," is insufficient to warrant a finding in favor of the importers' claim.

Parts of Plows

The board in overruling a protest made by W. White rules that parts of plows are not included in the provision in the act of 1909 for "plows." It appears that the parts of plows imported by the protestant were taxed at the rate of 45 per cent. under the tariff paragraph for "manufactures in chief value of metal." Under the claim advanced by the importer, the rate, if granted, would have been only 15 per cent. General Appraiser Fischer, in overruling the contention, says that paragraph 476 provides for "plows" only and not for their parts.

Metal Furniture

The S. & G. Gump Company has been defeated in a controversy with the customs authorities regarding the classification of furniture claimed by the officials to be composed in chief value of metal, whereas the importer alleged that a rate lower than 45 per cent. should accrue on the merchandise. The paragraph under which the importer's claim is made provides for "house or cabinet furniture wholly or in chief value of wood, wholly or partly finished." The decision for the Board of General Appraisers says that the local appraiser's return of metal chief value, not having been controverted, it follows that such furniture is subject to duty under paragraph 100 of the tariff act of 1909 as assessed.

Iron Drums as Containers

The board has sustained a protest filed by Atkins, Kroll & Co., asking free entry for iron drums containing oil of mirbane. It was alleged by the importers that the drums in question are the "usual coverings" for the merchandise, and this contention is upheld. The appraiser reported that the drums are similar to glycerine drums, except that they are of larger capacity.

Another firm involved in litigation with the Government regarding the question of whether drums are "usual," or "unusual," is Whittier, Coburn & Co. The drums in this case contained wood preservative. The drums were assessed as unusual, under paragraph 199 of the tariff of 1909, and were claimed to be dutiable as usual coverings, or under paragraph 151, at the specific rates applicable to "tubes." In overruling the protests the board holds that the coverings are unusual, while paragraph 151, under which the importers make an alternate claim, is construed to cover only gas tanks, reservoirs, holders and tubes used not only in the transportation of their contents, but designed for use in holding gas or liquids and subsequently used to regulate and control the use of their contents.

Bronze Castings Not Statuary

Adverse action has been taken by the board on protests filed by O. G. Hempstead & Sons and others. The merchandise consists of cast bronze busts and imitation bronze figures composed of zinc. Duty was assessed at 45 per cent. under the provision in the Dingley tariff for manufactures of metal. The importers' claim was that the articles should be allowed to enter as "statuary" at the rate of 15 per cent. ad valorem. Judge White states in his decision overruling the protests that, according to the report submitted by the local appraiser, the articles are not "wrought by hand" according to the sense of that term as used in the law, and hence are dutiable properly as assessed as commercial bronzes under the provision for "manufactures of metal."

The Richards-Ingalls Iron Works Company, recently incorporated, has succeeded the Richards Iron Works, Birmingham, Ala., taking over an established business. The entire plant is being overhauled and is now practically ready to do all kinds of ornamental and structural iron and steel work, making and installing freight and passenger elevators, hoisting rigs, fire escapes and jail work, also general castings in iron, steel and brass and engine and repair work. The company will further deal in new and second-hand engines and boilers. J. C. Richards is president; M. J. Gregg, vice-president; R. I. Ingalls, secretary, treasurer and purchasing agent.

A Heavy Standard Embossing Press

A New Knuckle Joint Machine Exerting a Pressure of 350 Tons

The style G knuckle joint embossing press shown in the illustrations is designed by its builder, the Standard Machinery Company, 7 Beverly street, Providence, R. I., for work where an exceptionally heavy pressure not exceeding 350 tons is required. Fig. 1 is a view of the front and side of the press and Fig. 2 a rear view of the machine, showing the toggles and gearing.

The construction of the machine is massive and powerful throughout, as can be seen from the engravings. The frame is a single steel casting having a tensile strength of 80,000 lb. per square inch, and weighs 7000 lb. The bed is 10 in. thick. The crank shaft is of forged nickel steel, while the main toggle, which it drives in a horizontal direction, is of forged steel, bronze bushed around the wrist pin. The main driving toggle has a net weight of 600 lb. The two upright toggles, which straighten out to give the vertical motion, are of forged steel, the lower one being seated in phosphor bronze thrust shoes in the cast steel slide. The supporting pin of the slide, as well as the two toggle pins, are of hardened and ground tool steel and

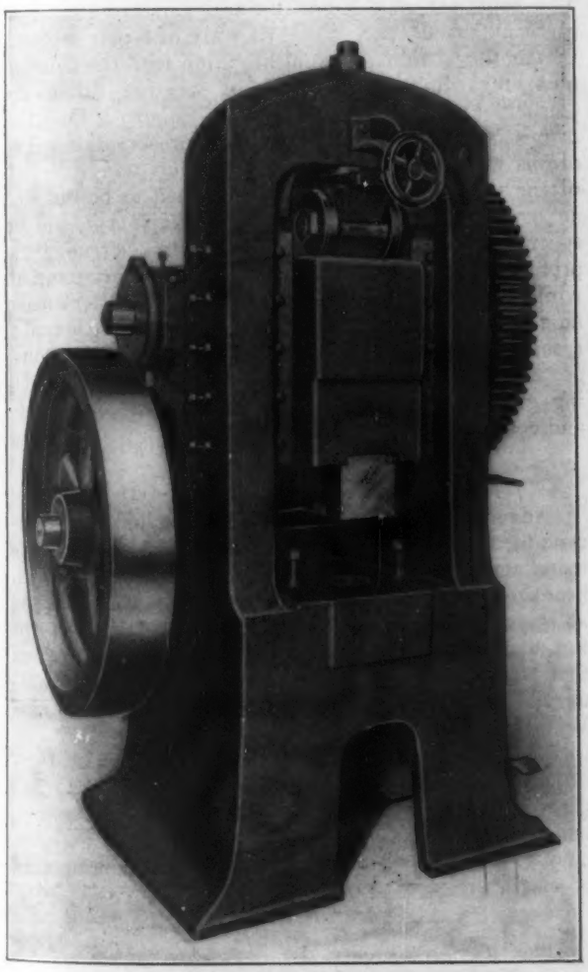


Fig. 1.—The Style G Knuckle Joint Embossing Press, Built by the Standard Machinery Company, Providence, R. I.

are provided with oil grooves. The maximum width through the section of the upright is 12 in. and the maximum length, the distance from front to back, is 27 in.

The driving shaft, running in solid cast steel boxes, bushed with phosphor bronze, is fitted with a 1300-lb. flywheel, 42 in. in diameter, with 7-in. face, set close to the frame and supported by an outboard bearing. On the opposite end of the shaft is a forged steel pinion, which drives a cast steel clutch driving gear, shown at the right of Fig. 2. Both the pinion and the gear have cut teeth, and the latter is fitted with a roller friction clutch of the company's patented instantaneous type, which is designed to withstand unusually heavy duty and at the same time to stop so quickly as to give only 1-32 in. of travel after engagement. The dog or latch of the clutch is fitted with a special counterweight for high speed, relieving the strain of the quick stop.

The adjustment of the press is controlled by the hand wheel in front at the top of the arch and con-

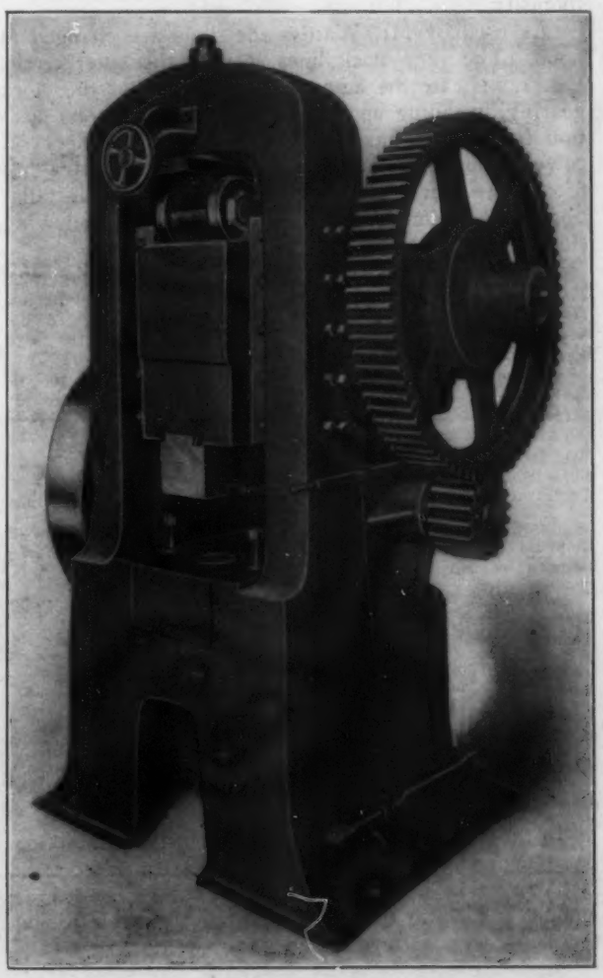


Fig. 2.—Rear View of Press, Showing Toggles and Gearing.

sists of a hardened and ground steel wedge sliding between wedge collars and an adjusting screw running through the arch and controlled by a large swivel wrench, the collars acting as check nuts. With this wrench the operator is able to lift the entire weight of the plunger and toggles with comparative ease.

The machine has both hand lever and treadle tripping devices, which are shown in Fig. 2 at the right under the gears, and is set upon a substantial cast iron base which is hollow underneath. The distance between the uprights at the bed of the press is 17½ in. and the minimum distance between them is 15¾ in. When a hole in the bed is provided it is regularly 5 in in diameter, but can be made as large as 15 in. in diameter for circular holes or the same size as a maximum for either dimension of a rectangular hole. For special purposes the machine can be made with a minimum space of 8 x 12 in. between the uprights at the point of contact, for small pieces requiring heavy pressure for their formation. The gibs are of the finest cast iron, forming an excellent bearing surface for the cast steel, and are of extra length, giving the slide a complete bearing.

Further details of the style G back geared press follow:

Weight of press, pounds	13,800
Weight of flywheel, pounds	1,300
Diameter of flywheel, inches	42
Face of flywheel, inches	7¼
Length of stroke, inches	1¼
Adjustment of slide, inches	⅝
Size of bottom of slide, inches	14½ x 10
Thickness of bed, inches	10
Width of bed, inches	34
Depth of bed, inches	32
Floor space, feet and inches	6 9 x 5 6
Total hight, feet	8
Distance between gibs, inches	16
Ratio of gearing	5 to 1
Pressure at bottom of ram, tons	350

The press is also made in a plain type, which has the same general dimensions as those given above, except that the pressure exerted is only 240 tons. The weight of the plain press is 12,500 lb. and of the balance wheel 1800 lb., its diameter being 50 in.

The Monarch Bolt and Rivet Heating Furnaces

New Models Intended to Protect the Operator from the Heat

Two new types of furnaces using oil or gas and air for fuel have been developed and placed on the market

Fig. 1.—View of the Monarch Eclipse Bolt Heating Furnace, Manufactured by the Monarch Engineering & Mfg. Company, Baltimore, Md.

by the Monarch Engineering & Mfg. Company, 1200 American Building, Baltimore, Md., for heating bolts and rivets. The particularly noteworthy features about the bolt furnace are the protection of the operator during the placing and withdrawing of the blanks from the furnace, an improved type of table to prevent the blanks from coming in contact with and adhering to each other during the heating process, provision to prevent the surface of the table from becoming overheated because of its proximity to the furnace lining, an adjustable bracket for enabling the operator to feed the furnace easily, and a novel arrangement of the firebrick in the furnace. Figs. 1 and 2 are exterior views of the bolt heating furnace, while Fig. 3 shows sectional and exterior elevations of a preheating rivet furnace.

The bottom of the bolt furnace is supported on standards and is provided with a back and sides. The bottom also supports a front plate and the shelf shown in the illustrations is fastened thereto with brackets. This shelf has upright supports at either end, which can be adjusted to take care of any desired number of blanks. The firebrick lining of the furnace extends almost to the top of the front plate, where there is a table extending the length of the furnace and protected by a firebrick lining. This table, which is shown clearly in Fig. 2, just below the water chill plate is provided with a number of transverse grooves across its upper face for the reception of the bolt blanks and is hollowed out for the reception of water which is introduced by the water feed pipe and is carried off by the water outlet pipe at the opposite end of the table. Over the table is a vertical protector, which is chambered to receive water introduced through the connecting pipes shown at the right and left of Figs. 1 and 2, respectively, the waste water being carried off through an overflow pipe. This protector consists of a flat chamber of substantially rectangular cross section, which is provided with a beveled lower edge to permit the introduction of the blanks on the table and is provided with a lining of firebrick or similar material. The burner, which can be of any ordinary construction, is supported by the back of the furnace and is surrounded by a lining of firebrick of such a form as to produce a central cavity in the furnace, which flares toward the firebrick lining of the front and is provided with an opening at the top through which the burning gases can escape.

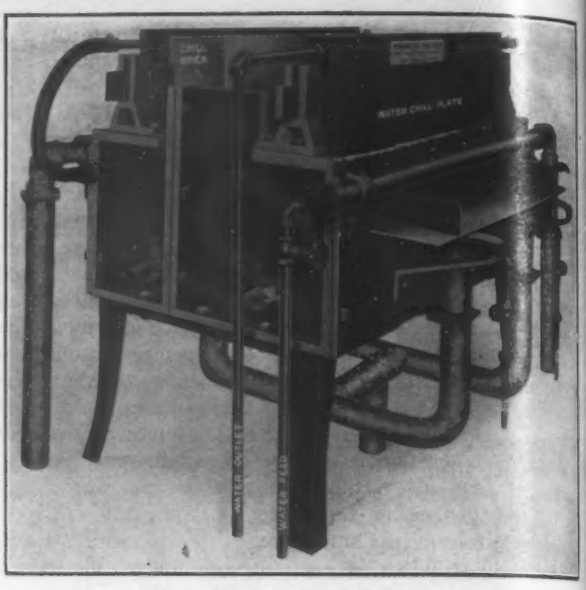


Fig. 2.—Side and End View of Bolt Heating Furnace.

This arrangement enables the operator to place a

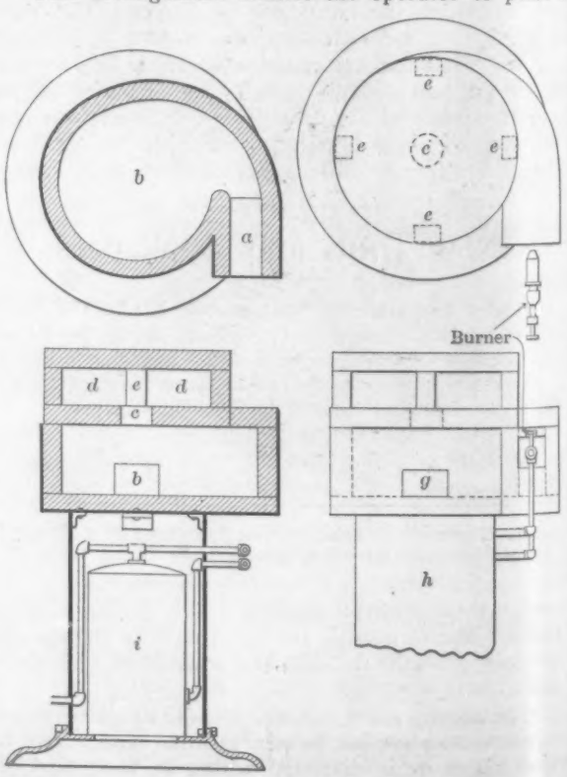


Fig. 3.—Section and Elevation of the Gyratory Flame Pre-Heating Rivet Furnace.

number of blanks upon the lower shelf and adjust the supports at either end. He then places the blanks on the upper table in the transverse grooves and while doing so is protected from the heat of the furnace by the vertical water chill plate and the table through which a continuous circulation of water is maintained.

In the rivet heating furnace illustrated in Fig. 3 the flame is directed into the combustion chamber *a*, where the oil becomes thoroughly ignited before passing into the heating chamber *b*, which is so constructed as to give the flame a rotary motion, thus distributing the heat uniformly throughout the entire interior. The excess heat escapes through the opening *c* and distributes itself through the open chamber *d*, where the rivets may be placed prior to their being put into the heating chamber. The top tile is supported by four piers, *e*, and two doors, a front and a back one, *f* and *g*, are provided for putting in and taking out work.

The furnace is supported on a cylindrical steel sheet containing the small fuel oil tank *i*, which draws its supply from the larger one, *h*, outside. The whole furnace is supported on a cast iron base. The top is made of steel securely welded together, with angles riveted to the bottom of it, so that the top may be set on the steel sheet without being permanently attached thereto. The supply for the small fuel oil tank is obtained through the same pipe as that feeding the burner.

This furnace is portable and made in standard sizes, so that it can be readily carried around from place to place by two men. This furnace is especially recommended for ship, bridge, boiler and general construction work, and it is stated will produce better results than those heretofore secured from the hard coal or coke forge, as, being used in connection with oil or gas fuel, they are effective and economical. This furnace is a rapid heater, due to the pre-heating feature, and the rivets can be brought to a white heat in 3 min. with a compressed air pressure of 20 lb. and a volume of 15 cu. ft. per minute. It can also be used in connection with the maker's high pressure blower, which is furnished in various sizes, according to the number of forges in use. This furnace is said to be able to supply rivets for one or more gangs faster than they can be driven by pneumatic riveting machines, and the capacity of the furnace is merely the rate at which the rivets can be driven. The rated capacity of this furnace is given as 3000 ¾-in. rivets per day. The fuel consumption is said to be very low, due to the fact that the burners are regulated for the largest volume of air consistent with the lowest consumption of oil, which varies from 1½ to 2 gal. per hour, according to the quantity of rivets to be heated.

New Tools and Appliances

Stocks and Dies for Automobile Kits.—The Wiley & Russell Mfg. Company, Greenfield, Mass., has placed on the market a set of stocks and dies put up in a leather roll to meet the demand for a small and convenient form. Eight dies, ranging from ¼ to ⅝ in. in size, for threading bolts and nuts with the A. L. A. M. standard threads, comprise the set. The dies are round with a 1½-in. external diameter side adjusting screw and the stocks have gun lock centers. With a set of this kind jammed threads can be recut quickly and broken bolts instantly replaced. The leather roll, which is substantially made, is 14 in. long by 4 in. wide when closed and weighs about 2 lb.

Smoke Consuming Boiler.—The Smoke Consuming Boiler Company, Johnson City, Tenn., is now getting equipped to manufacture a boiler which is claimed to positively burn its smoke and effect a saving of 20 to 30 per cent. in the fuel. It is described as extremely simple in construction, having a large hopper that incloses the firebox, which extends above the top of the boiler and is filled with coal, holding 2 tons or more. The coal is automatically fed down on the grate and is converted into coke before it reaches the grate. The gas and smoke is drawn through a small opening directly over the hottest part of the fire, where it is consumed. In a test of a boiler rated at 45 hp. there was actually developed 88.4 hp., or nearly twice the commercial rating without emitting black smoke from the stack. The boiler evaporated 12.77 lb. of water per pound of combustible from and at 212 degrees F. and consumed 3.16 lb. of coal per horsepower per hour, generating steam at an average pressure of 97 lb. The boiler is the invention of W. J. Ellis of Andrews, N. C.

Mandrel and Drill Presses.—The G. T. Eames Company, Kalamazoo, Mich., will engage in the manufacture of a newly patented mandrel press, embodying a number of improvements, and a line of drill presses. Later it is intended to manufacture a complete line of emery wheel grinding machinery.

Converter.—J. V. Bretaud, 488 Cass avenue, Detroit, Mich., has designed a steel converter that embodies a number of novel and practical features. The renewal of converter linings is expensive and an important item in the cost of making steel, as it necessitates a converter being out of service from 12 to 18 hours. This new converter was designed to reduce the inactive period to a minimum and render the operation continuous. The converter is divided into two parts and after the slag has been cleaned off, the top part is taken off and inverted so that the lining of both sections is exposed to the action of the air and cools in about 4 hours. The patching, it is said, can be done in about 2 hours, which makes the total time the converter is out of service only 6 hours. If it is desired to reduce the time for making repairs still further, a spare top can be kept lined up ready to replace the one to be repaired. These converters are built in three sizes, having capacities of one, two and three tons, respectively, and all the auxiliary equipment for making steel is furnished. The capacity of the smallest size can be reduced to ½ ton by increasing the thickness of the lining.

The Scott Brazing Furnace.—C. U. Scott, Davenport, Iowa, has brought out a brazing furnace designed for operation by either illuminating gas or gasoline and provided with two burners mounted on standards located on each side of the table. The blocks by which the burners are attached to the standards may be adjusted in either a vertical or horizontal flame or vertically on the standards, thus enabling the flame to be brought to bear on any part of the furnace. The connections with the air and gas pipes are made by flexible hose and valves at the side of the table provide a convenient means for proportioning the mixture admitted to the burners. The top of the furnace is supported on well-braced legs and is provided in the center with a rectangular opening through which long pieces can extend. Heating the work without scaling it and the elimination of all possibility of the burners blowing out while in operation are two of the important advantages claimed for the furnace. A temperature of 1872 degrees is available as soon as the burners are lighted.

Fractional Adding Machine.—The Keuffel & Esser Company, 127 Fulton street, New York, has developed and placed on the market a simple but practical instrument for adding fractions in sixty-fourths or multiples thereof up to 16 integers. The adder consists of a white xylonite disk revolving on an octagonal polished wood base covered with the same material and having near its circumference 64 indentations corresponding in position to the fractional graduations marked on the base. A nickel plated stop is attached at the lower edge of the base and projects over the disk so that if a pointed instrument or pencil point is placed in the small indentation at the circumference of the disk opposite the fraction to be added and the disk rotated until arrested by the contact of the stop with the pointer the fraction will be registered in the counter in the disk. To add a number of fractions it is simply necessary to place the pointer in the indentation opposite each term to be added and rotate the disk until the pointer comes against the stop. The counter will show each successive total through the two windows in the disk, one of which gives the integer and the other the fraction.

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1¾ in. round and square; 1½ to 4 in. x ⅜ to 1 in.	₩ lb 1.90¢
1½ to 4 in. x ¼ to 5-16	₩ lb 2.10¢
Rods—⅜ and 11-16 round and square	₩ lb 2.10¢

Angles: Cts ₩ lb.

3 in. x ¼ in. and larger	2.10¢
3 in. x 5-16 in. and ¼ in.	2.35¢
1½ to 2½ in. x ¼ in.	2.20¢
1½ to 2½ in. x 5-16 in. and thicker	2.10¢
1 to 1¼ in. x 3-16 in.	2.20¢
1 to 1¼ x ⅛ in.	2.30¢
⅞ x ⅛ in.	2.40¢
¾ x ⅛ in.	2.50¢
⅝ x ⅛ in.	3.55¢
½ x 3-32 in.	4.35¢

Tees:

1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in.	2.35¢
3 in. and larger	2.15¢
Beams	2.10¢
Channels, 3 in. and larger	2.10¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

	Black, One Pass, C.R Soft Steel.	Black, R. G. Cleaned.
No. 16	₩ lb 2.90¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢, B, 9¢ net.

Galvanized.

Nos. 14 to 16	₩ lb, 3.20¢
Nos. 22 to 24	₩ lb, 3.55¢
No. 26	₩ lb, 3.75¢
No. 28	₩ lb, 4.10¢

No. 20 and lighter 36 inches wide, 25¢ higher

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb 5.75¢
No. 26	₩ lb 6.25¢
No. 28	₩ lb 7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd
No. 24 ₩ 100 sq. ft.	$3.35	4.80
No. 26 ₩ 100 sq. ft.	2.95	4.00
No. 28 ₩ 100 sq. ft.	2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.60
A. Charcoal:	
IC, 14 x 20	$5.40
IX, 14 x 20	6.50

American Coke Plates—Bessemer—

IC, 14 x 20 ..... 107 lb	$4.40
IX, 14 x 20	5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8.50
IX, 20 x 28 with an 8 lb. coating	10.50

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 19½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 14½¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 14½¢ ₩ lb

Brass Wire—

List August 1, 1908. 14½¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 14 ¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig ₩ lb 34½@35½

Copper—

Lake Ingot	₩ lb 14½@15
Electrolytic	₩ lb 14½@15
Casting	₩ lb 14¼@14½

Spelter—

Western ₩ lb 6¼@6½

Zinc.

No 9, base, casks ₩ lb 8 ¢ | Open ₩ lb 8¼

Lead.

American Pig	₩ lb 5 @5¼
Bar	₩ lb 6¼@6½

Solder.

½ & ½, guaranteed	₩ lb 22 @22½
No. 1	₩ lb 19 @19½
Refined	₩ lb 17½@17¾

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb ..@30
Hallett's	..@30
Other Brands	@29

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting ..@..

Rods & Wire ..Base Price 30¢

Sheets ..Base Price 30¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 10.25@10.50
Copper, Heavy and Wire	₩ lb 10.00@10.25
Copper, Light and Bottoms	₩ lb 9.00@9.25
Brass, Heavy	₩ lb 6.75@7.00
Brass, Light	₩ lb 5.50@5.75
Heavy Mechine Composition	₩ lb 9.25@9.50
Clean Brass Turnings	₩ lb 6.75@7.00
Composition Turnings	₩ lb 8.00@8.25
Lead, Heavy	₩ lb ..@3.75
Lead, Tea	₩ lb ..@3.50
Zinc Scrap	₩ lb ..@3.75

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